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Lon W. Morrey, D.D.S., Editor

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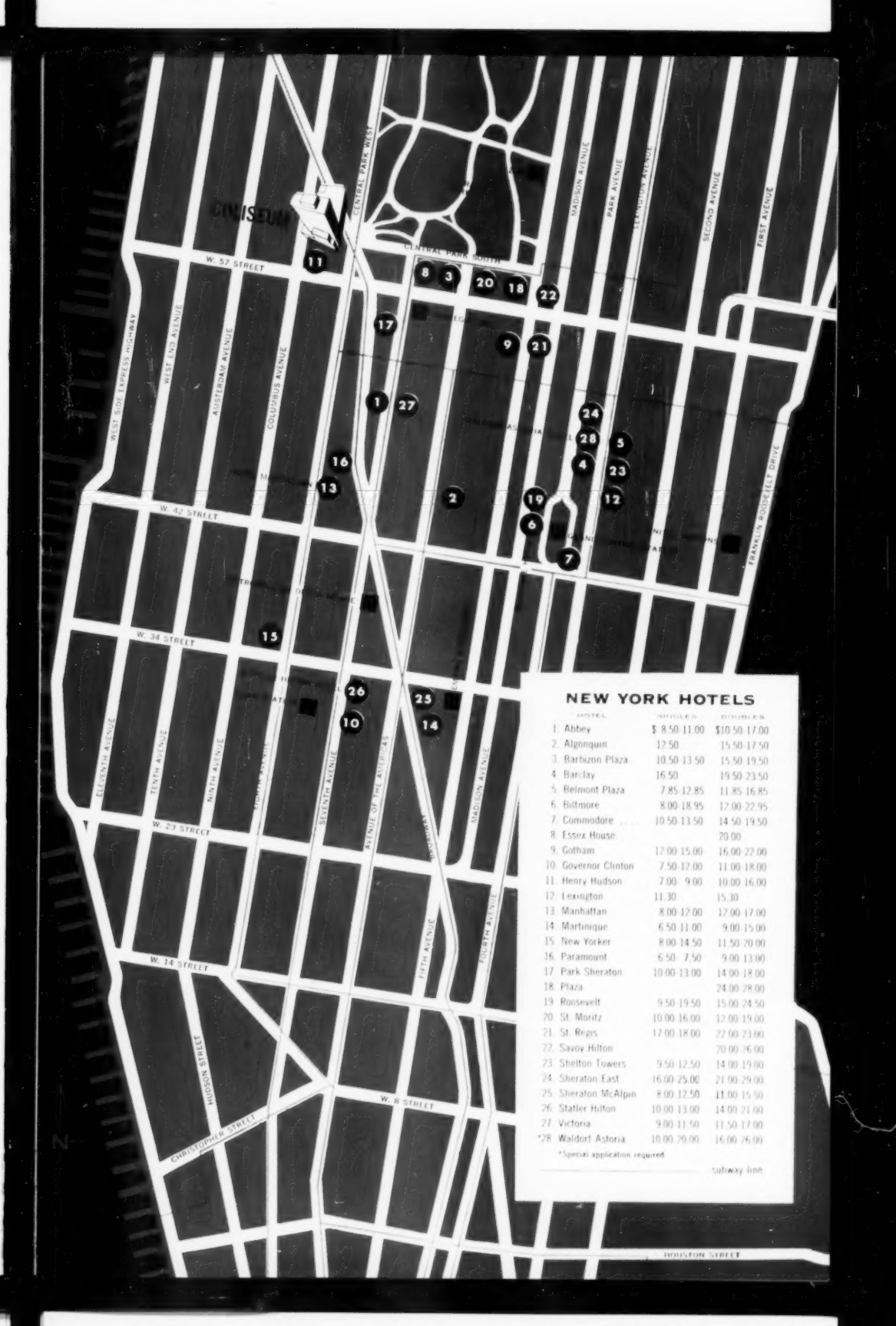

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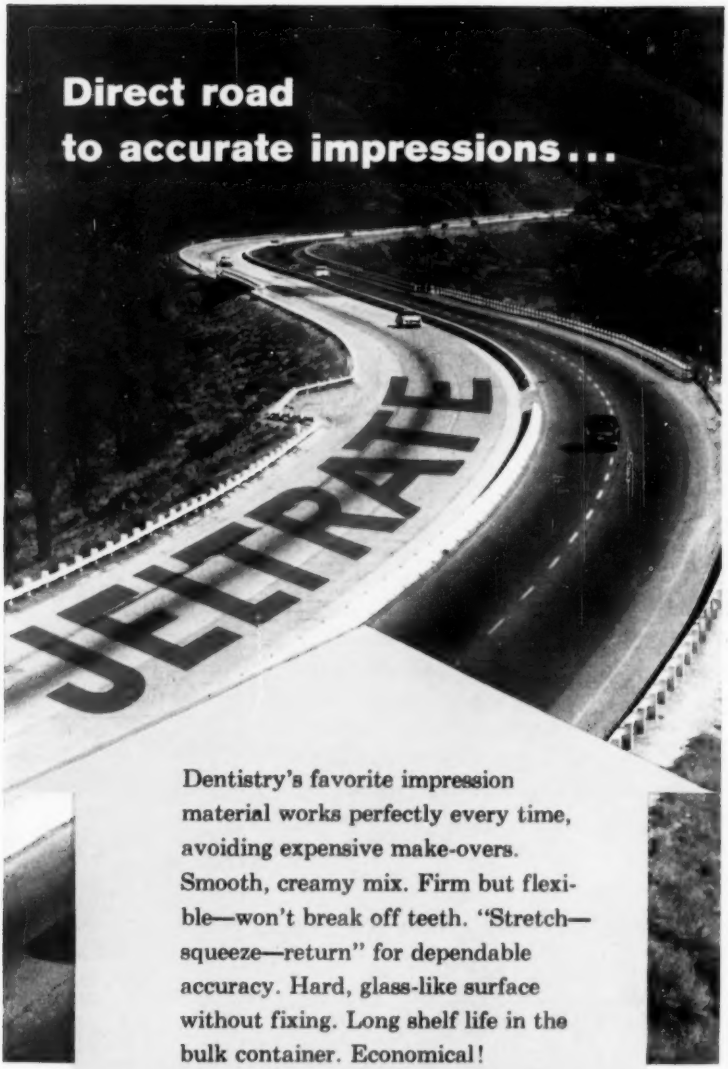

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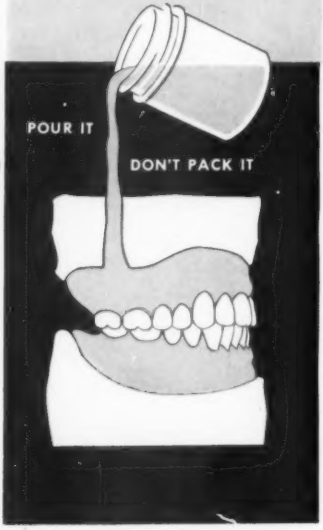

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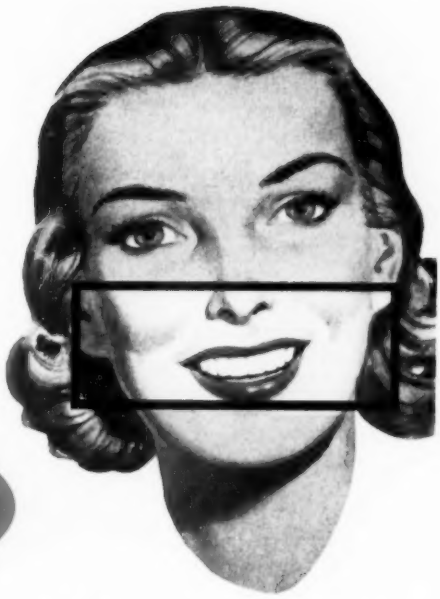

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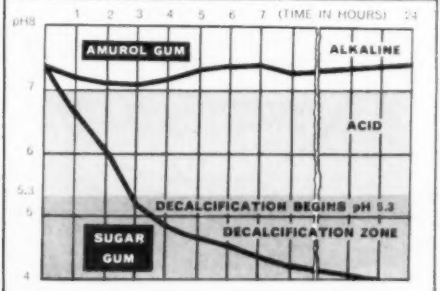

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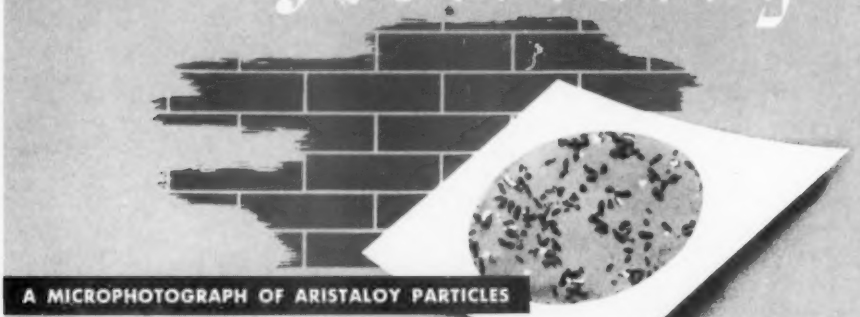

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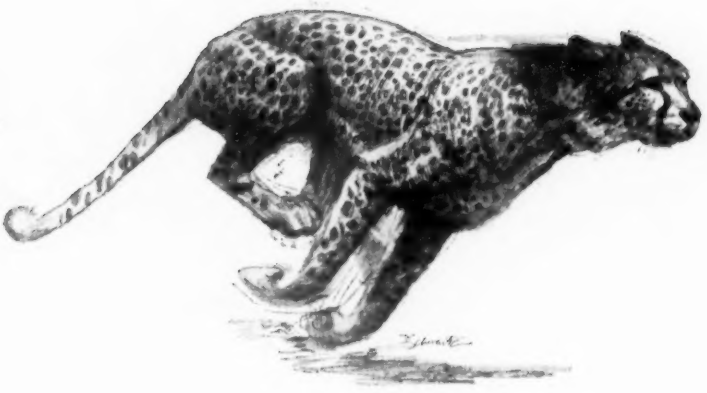

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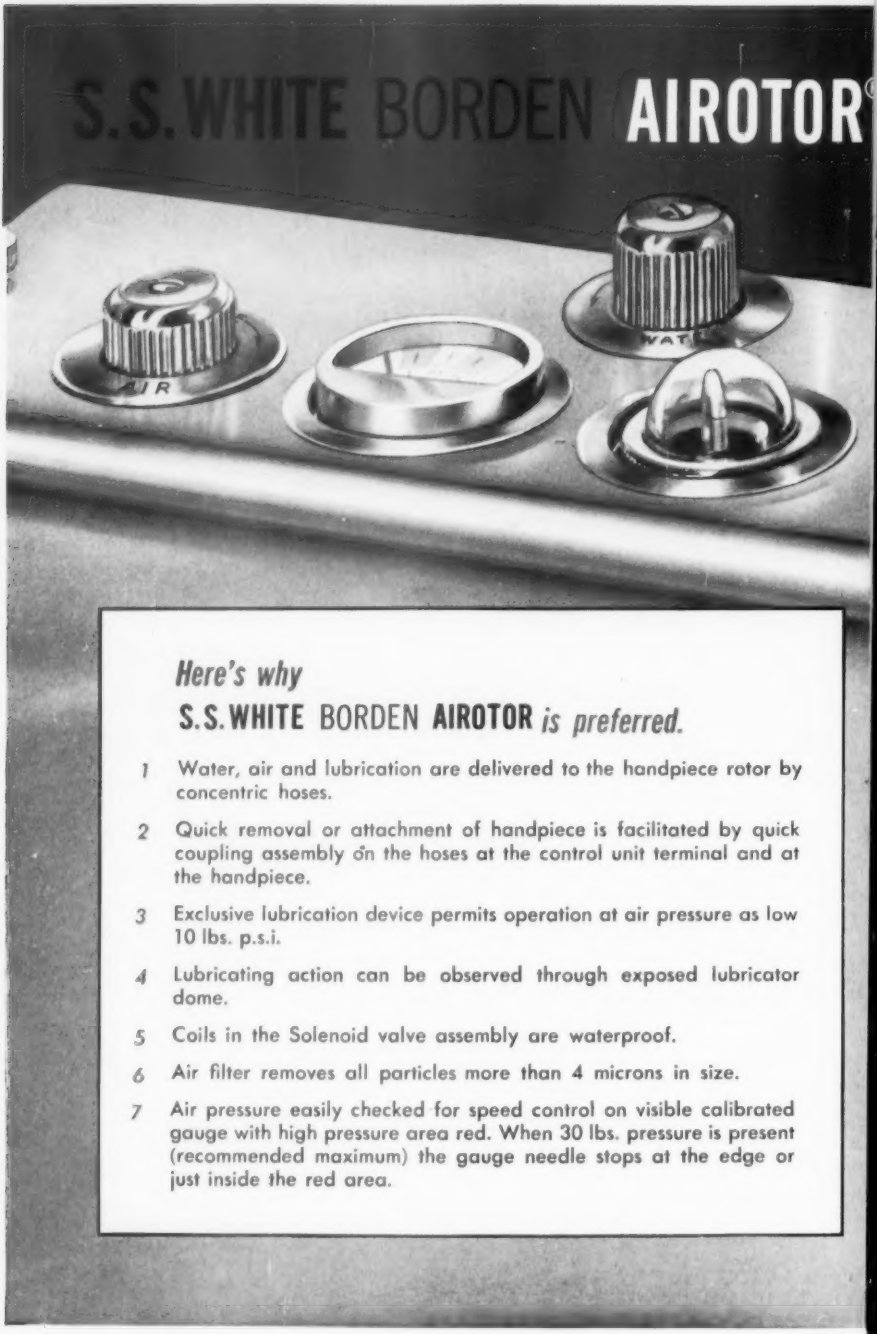

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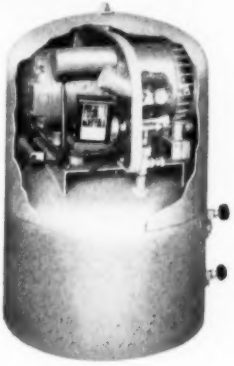

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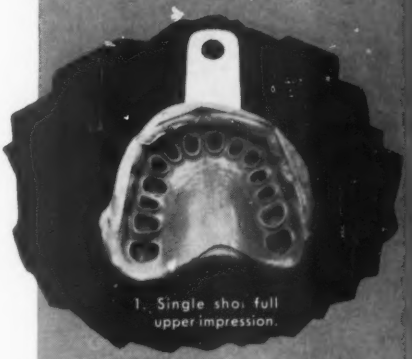

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The patient, the tooth and the dentist: a modern perspective of tooth preparation

Robert J. Nelsen, D.D.S., and Alice E. Nelsen, R.D.H., Washington, D. C.*

In spite of remarkable success in the reduction of the incidence of dental caries in many segments of the population through the fluoridation of communal water supplies, the treatment of the carious tooth by the dentist in his office will continue to be the primary concern of the dental profession for some time to come.

It is a well known fact that many dental restorations fail because of inadequate cavity preparation. Frequently, teeth are improperly prepared because either the patient will not submit to the unpleasantness of the drilling or the dentist often finds it uneconomical in time and energy to contend with the resistance of the tooth and the patient to complete a proper preparation. For over a century the dental drilling procedure has been the greatest deterrent to the patient's desire and the dentist's ability to accomplish good restorative dentistry.

The purpose of this paper is to present some observations of the principles of tooth cutting made over a period of four years using equipment and technics developed by the author.[1] The equipment used was the commercial model of the hydraulic turbine contra-angle handpiece known as the "Turbo-Jet." A simplified technic of tooth reduction employing the unique advantages of this instrument will be described later in the paper.

APPROPRIATE ROTATIONAL SPEEDS

The Turbo-Jet handpiece introduced the principle of a fluid-driven turbine contra-

Presented before the Midwinter Meeting of the Chicago Dental Society, Chicago, February 4, 1958.

A portion of this work was done while the author (R.J.N.) was employed by the American Dental Association at the National Bureau of Standards, Washington, D. C. The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the American Dental Association or the National Bureau of Standards.

*Clinical associate professor, Georgetown University School of Dentistry.

1. Nelsen, R. J.; Pelander, C. E., and Kumpula, J. W.: Hydraulic turbine contra-angle handpiece. J.A.D.A. 47:324 Sept. 1953.

angle handpiece. Its free running speed of 50,000 rpm has been found to be most appropriate to all factors involved in the cutting procedure. The development of this new concept of fluid drive was soon followed by an extension of the turbine principle into speed ranges beyond those for which the original tool was designed. The use of increased rotary speeds has now developed into the realm of "super-speeds" and "ultra-speeds." The terms "super-speed" and "ultra-speed" are themselves the best explanation of the mistaken assumption that because increased rotational speed is good, more speed is better, regardless of the attendant problems that develop with the over-use of rotational speed. "Super-speed" is defined as that speed which is in excess of the appropriate speed. "Ultra-speed" can be defined as that speed which is excessively beyond that which is right or proper. These are the dictionary definitions of the prefix "super" and the prefix "ultra." They are not selected by the author to define these speeds but by those who advocate them. The rotational speed of the tool is but one of a number of factors which determine the most appropriate method of tooth reduction. When all the interrelated factors involved in tooth cutting are adjusted to produce the optimum cutting conditions, it will be obvious that about 50,000 rpm is a most appropriate rotational speed.

FAILURE OF NONROTARY CUTTING METHODS

During the last few years, nonrotary methods of cutting teeth have been devised in a sincere effort to eliminate or circumvent the short-comings of the century old principle of the belt-and-gear drilling mechanisms. Although some of the newer principles have been unique and the equipment has been effective as a means of cutting tooth structure *per se*, none has been generally accepted by dentistry for the preparation of teeth clinically. Their specific shortcoming is due to the manner in which the abrasive cutting particle is applied to the tooth. The air abrasive method described by Black[2] uses a compressed gas to propel small particles of abrasive against the tooth. The many advantages of this method in cavity preparation are outweighed by the complete lack of control by the operator of the cutting particle once the particle leaves the nozzle of the instrument. The ultrasonic device described by Oman[3] uses a magnetostrictive principle to develop cutting action by the agitation of particles of an abrasive in a water slurry. In this application also, the dentist loses absolute control of the cutting particle as it acts on the tooth surface. To cut hard tooth structure efficiently and comfortably, it is necessary to maintain complete control of the cutting particle as it contacts the tooth. However, the operator must apply the abrasive particles to the tooth without creating any additional trauma to the tooth by the tool or by the machine which drives the tool.

REQUIREMENTS OF APPROPRIATE CUTTING TOOL

The removal of material from the surface of a structure requires the application of energy to that surface to break the molecular bonding of the tooth material. In the ideal method of cavity preparation, no extra energy of any kind would be applied to the tooth. Properly used, the Airdent and the Cavitron are unique in the efficiency with which they apply only that energy necessary for the removal of tooth structure. For this reason they have a high degree of patient acceptance. Unfortunately, in both these

2. Black, R. B. Technic for nonmechanical preparation of cavities and prophylaxis. J.A.D.A. 32:955 Aug. 1945.

3. Oman, C. R., and Applebaum, E. Ultrasonic cavity preparation. Preliminary report. New York State D.J. 20:256 June-July 1954.

methods the complete control of the cavity development is lacking. This control can be provided only by the use of rotary motion. Only a rotary tool allows the operator precise control of the abrading particle during its cutting action. However, it must be designed so that it provides a means of applying the tool to the tooth without producing concomitant vibration and excessive heat. This requires that the small particles of abrasive be bonded to a perfectly centered tool and that this tool be rotated by a vibration-free machine at a speed which gives the most efficient cutting action to the particle and allows the operator to maintain complete control of the operation.

KINETICS OF ROTARY INSTRUMENTATION

Current methods of attaining exotic rates of tooth reduction by greatly increasing the rotational speed of bladed burs is not reasonable. Only a very narrow margin of operator control is afforded because of the excessive energy developed in the large bur blades. The kinetic energy of the moving blade is equal to one half its mass times its velocity squared ($K^1=1/2MV^2$). Since the pressure placed on the bur by the operator largely controls the effective mass of the blade in its cutting action and since the velocity is exceedingly high (200,000 rpm as advocated), the operator must control the feed rate of the tool on the tooth to within very narrow limits. When a bladed tool is used at these excessively high velocities, the range between noneffective cutting and over-cutting is very small. It becomes very difficult if not impossible to monitor the development of the cavity preparation in many areas of the mouth. That abusive cutting action also occurs when a bur is used at such speeds is evident by the ease and the frequency with which the blades are knocked off the bur, by the development of an odor of excessive heat and by the noticeable fracture of the enamel margins as the bur crashes into them.

The use of bladed burs for gross tooth reduction is a tradition in dentistry which evolved from the early use of hand rotated files. These were used to remove decay and to improve the retention areas of the cavity. In spite of the drilling machine, the rotary speed, or the material from which the bur is made, the use of a bur is illogical except in those areas and in the same manner as their original use. The bur is for the removal of decay and for making slight internal detail of that portion of the cavity in the dentin. Very sharp, bladed steel burs should be used only at very slow rotational speeds and for the same purpose as one would use a hand instrument.

The most efficient cutting tool available to dentistry is the diamond-coated instrument. A well made, diamond-coated tool mounted in a vibration-free handpiece gives the dentist a controlled orbit of very small, highly abrasive particles. If these hard, sharp, whirling particles are applied to the tooth surface so that only their tips contact the tooth, a very desirable nontraumatic abrasive action is effected and, in addition, complete control of the particle of abrasive and the development of the cavity are maintained. To use the diamond tool properly, however, the operator must develop in his fingers very refined tactile sensibilities of the pressures with which he applies the tool to the tooth. If the particle on the tool is rotated too rapidly, however, the kinetic energy of the particle is excessive and these tactile sensations are lost because most of the required cutting energy develops as a result of particle velocity only. On the other hand, if the particle rotates too slowly, it is necessary to compensate for its lack of velocity by applying heavy hand pressures which impair the tactile sensibilities of the fingers as well as damage the diamond tool and create considerable frictional heat and vibration.

It has been found that one piece steel tools plated with 180 mesh diamonds and rotated about 50,000 rpm have the optimum cutting qualities for the efficient clinical technics to be outlined subsequently.

The requirements for attaining such optimum cutting qualities are:

1. Sufficient cutting rate so that the operation can be done with dispatch.

2. Adequate torque/speed ratio which allows proper tactile stimulation so that the operator by finger pressure is able to sense the passage of the tool through the tooth.

3. A cutting tool which has absolutely no run-out or imbalance of diamonds or plating, which is perfectly centered in the machine rotating it and which is positively locked into the handpiece so that no movement occurs between the tool and the chuck.

4. A machine which will rotate the tool without imposing unwanted vibration or noise.

It should be noted here that if the cutting tool is permitted a freedom of movement within the chuck there will occur at certain critical speeds a vibration frequency which develops a wobbling motion of the tool in the chuck. In some ultra-speed instruments which operate at 200,000 rpm, this vibration can be felt by the fingers throughout the entire handpiece if it is held lightly. The handpiece seems to "expand" between the fingers as critical speeds are reached and the vibration frequency of the tool equals the natural frequency of the handpiece. Neither the cutting tool nor the handpiece should develop vibration or allow an eccentric action of the tool which will interfere with the abrasive particles following a perfectly circular orbit.

GEOMETRY OF CAVITY DEVELOPMENT

Consideration must be given to several important factors which influence the contacting relationships of the tool and the tooth if maximum cutting efficiency is to be realized. The first contact of the tool and the tooth is a tangential contact. If this occurs at the tool's edge, it is approximately a point contact, whereas if it occurs on the side of a tool, this contact is a line. If the entire circumference of the tool remains in contact with the tooth during the first revolution, the cutting will be done by those diamond particles distributed about the circumference at the point of contact. (For purposes of discussion it is assumed that the tool does not penetrate significantly during the first revolution.) If the entire side of the tool is in tooth contact during the first revolution, a much larger area of the tool is able to function. If the tool or the handpiece rotates eccentrically, the total tool contact area per revolution is reduced and the cutting rate of the tool lessened proportionally.

The contact area of the tool on the tooth per revolution influences its cutting rate. The operator must realize that, in the initial phases of introducing the smaller tools into the tooth, the contact area is very small, hence the cutting rate will be low. The tool must never be hurried into the tooth by excessive force but must always be allowed to work itself into the tooth until its maximum cutting relationships with the tooth are established. The size of the tool and the depth of its penetration determine the total area on which the tool can function. In other words, the larger the tool and the deeper its penetration, the greater will be the opportunity of each cutting particle to act on the tooth per revolution. However, there is a point at which the tool will begin to lose some efficiency as it seats deeper into the tooth. As the cutting particle passes over the tooth, the space in front of it begins to fill with debris. If this space becomes filled with debris before the particle has completed its pass across the tooth, the particle is unable to cut and thus becomes ineffective and

completes its path across the remaining surface of the tooth in a burnishing manner. This problem can develop even with a heavy water spray or stream directed on the tool. It occurs between the tool and the tooth where the washing water cannot reach under conditions of too heavy cutting pressures. The operator must develop a "feel" of the cutting action of a properly working tool and learn to judge by this feel the proper feed rate and thus obtain maximum cutting effectiveness.

USES OF WATER IN CUTTING

The most effective method of removing the accumulation of cut tooth material from the tool is by the use of water forced on the tool. In addition to the removal of tooth debris, the water acts as a coolant of the tool and the tooth, removing the heat which is an end product of the cutting which is, actually, the release of the energy (in the form of heat) which bonds the molecules of the tooth structure. It also dissipates any frictional heat which might be developed by the tool and lessens this development by acting as a lubricant between the tool and the tooth.

The addition of a wetting agent to the coolant water improves its effectiveness. The tooth, the tooth debris and the cutting instrument are brought into a more intimate contact with the water when its surface tension is reduced by the addition of a wetting agent.

The removal of water from the mouth during high speed cutting is not difficult because the tooth reduction occurs in such a short time the total volume of water per preparation is not great. The use of a vacuum type aspirator by the assistant is most helpful although not absolutely necessary. In the use of this method of water removal, it is important that the air volume-velocity ratio be adequate to draw the coolant water across the work area and not allow it to accumulate in the floor of the mouth.[4] Vacuum aspiration equipment which does not have an appropriate volume-velocity ratio is of less actual worth than a well placed ordinary saliva ejector.

The use of air alone as a means of clearing and cooling the tooth and the tool during cutting is contraindicated.

HISTOLOGICAL EVALUATION OF CUTTING METHODS

The ability of the tooth to withstand cutting procedures is simply due to the fact that it is an organ which is by nature intended to be subjected to repeated mechanical and thermal trauma. Only when a tooth is subjected to absurd applications of mechanical and thermal energy is its vitality endangered. For instance, the gentle tapping used in a properly executed foil technic will have little or no effect on the vital tissues of a tooth whereas conversely, the excessive rapping by an inexperienced student operator may very well jeopardize the life of the same tooth. The total energy (dose) and the rate at which it is applied to the tooth (dose rate) have significant effects on the response of vital tooth tissues. The amount of energy (trauma) that a given tooth can absorb and recover is a very difficult if not an impossible quality to assay. The evaluation of cutting procedures histologically by describing the pulp "reaction" without carefully stating the energy applied in terms of the total dose and dose rate is as meaningless as the evaluation of a sun lamp singularly in terms of skin reaction without stating total exposure, rate of exposure, wavelength of the light used and the type of skin irradiated. Not until histopathological "evaluations" are qualified by adequate descriptions of the total cutting procedure in terms of quality and quantity of energy applied will they have any greater value than the conclusions of the clinician

4. Thompson, E. O.: Clinical application of the washed field technic in dentistry. J.A.D.A. 51:703 Dec. 1955.

about the relative merits of one cutting procedure and another.

A most important factor in the preoperative planning of any tooth reduction procedure is the assessment of the recovery potential of the tooth. Very often, a conservative sequence of instrumentation on a diseased tooth followed by a period of rest under a sedative cement prior to the final cutting of the cavity and fabrication and cementation will afford the tooth an interim of recovery which may very well determine the survival of the tooth.

PATIENTS' RESPONSE TO CUTTING PROCEDURE

Two experiences of cavity preparation often confused by the patient are his actual sensations of pain and his feeling of unpleasantness. The actual feeling of pain can now be eliminated by the use of anesthetics; however, unpleasant sensations formerly associated with pain are often interpreted as pain by the patient when improper technics of cutting are used and even when very profound anesthesia of the tooth is effected. Whenever a patient is apprehensive about the operation, his responses to both pain and unpleasantness are greatly amplified. It has been observed that those patients who were hyper-responsive to operative procedures at the start became relaxed as soon as they realized that the tooth could be prepared without pain and that their former experiences of unpleasantness had been eliminated. Those factors of unpleasantness which are often confused with actual pain are vibration, heat, noise, resonance and pressure. They can be eliminated with proper equipment and technic.

A local anesthetic should be used routinely for all patients not only for the elimination of pain during cavity preparation but for the comfort it affords in the placement of clamps, matrix bands, cervical wedges, and so on. Although dental treatment may never develop into a pleasure-giving experience for the patient, it is now possible to provide the best dentistry without pain and with no unpleasantness. One of the most significant advantages of efficient and comfortable instrumentation is that the patient at the completion of the cavity preparation is relaxed and cooperative during the subsequent restorative procedures.

OBSERVATIONS OF PAIN DURING INSTRUMENTATION

In the observation of patients in two private offices, an attempt was made to learn the actual need of patients for an anesthetic for the cavity preparation alone. It was difficult to make valid conclusions regarding the actual need for an anesthetic. It was interesting to note, however, that many patients did not complain of pain during the initial cutting into the dentin. But after the partially prepared cavity had been inspected and a second instrumentation of the tooth was attempted, the patient complained of considerable pain. In other words, if the dentin was exposed by the tool and the preparation was continued without interruption, the operation was painless. However, if the procedure was interrupted for a brief time and either the use of the same rotary tool or a hand instrument was resumed, the patient then experienced pain. Although this phenomenon was not universal, it occurred often enough to be significant.

Possibly the pain could be caused by the sudden release of "microscopic" internal strains in the tooth. These strains may have developed in certain regions of the tooth during its development and calcification. The cavity caused by the tool allows high stress areas to develop at the angles of the preparation and to cause a "notch effect" in the stress pattern within the tooth. Such alterations in structure of the dentin may result in the localization and intensification of com-

pressive, tensile, or shear stresses which may alter or produce the mechanism of pain development in the dentin. In those teeth which were sensitive, any instrumentation such as wiping with a wisp of cotton or the production of slight thermal changes produced pain very easily. This development of pain varies in degree from tooth to tooth and in different regions of the same tooth. This would indicate a possible relationship to the development of stress concentrations as the result of the instrumentation or the sudden introduction of the cavity on the passivity of the tooth. The fact that teeth become sensitive irrespective of the method of introducing the cavity (air abrasive, ultrasonic, rotary or the rapid development of caries) would indicate that the geometric presence of the cavity would be a part of the sensitizing mechanism. Because the occurrence and the degree of sensitivity is unpredictable, the routine use of an anesthetic is advocated for all tooth reduction.

PRINCIPLES OF DIAMOND INSTRUMENTATION

The advantages of diamond instrumentation derive from an understanding of all factors influencing their cutting effectiveness. One of the important elements in the successful use of diamond tools is the realization that each tool has its individual maximum cutting capacity. This inherent ability to cut is determined by several factors peculiar to each tool and must be recognized by the operator. These are the characteristic design of the tool and the operator's manner of using it.

Those design features which determine the characteristics of the tool's cutting are: the size and shape of the tool, the mesh of the diamond particles, the amount of the particle exposed above the bonding metal, the space between the particles, and the concentricity and balance of the entire tool while rotating. Any deviation from preciseness in construction will impair the use of the tool. It is most important to good technic that all diamond tools be selected by the operator by a careful inspection with a hand lens before purchase.

The operational factors which determine the effectiveness of a diamond instrument are: the peripheral speed, the area of the tool contacting the tooth per revolution, the load maintained on the tool, the effectiveness of the water lubricant, the alignment of the tool and the tooth, and the usefulness of the tool as a gauge in the development of the cavity dimensions.

RATIONAL ROTARY INSTRUMENTATION

Because of the many complex factors involved in the total cutting procedure, it is impossible to isolate them one by one for study or discussion. Also, because they function in dynamic rather than in static combinations and relationships, any system of clinical instrumentation which recognizes the influences of these factors must be developed largely on an empirical basis. One such system of cavity preparation has been developed and is called "rational rotary instrumentation." The practicality of this system is judged by the enthusiasm of those who have made it a basis of their cutting procedure and by the ease with which undergraduate students[5] have grasped the few but important rules of tooth reduction and applied them clinically with unusual facility.

The objective of rational rotary instrumentation is to promote the ease with which the dentist can prepare a tooth properly and to make this aspect of his restorative service as acceptable to the patient as possible. The accomplishment

5. Special clinical technics course, School of Dentistry, Georgetown University, Washington, D. C.

of one objective furthers the attainment of the other.

EQUIPMENT

The equipment used in this technic is the "Turbo-Jet" dental unit (Fig. 1, left). This is a hydraulic turbine contra-angle handpiece of commercial manufacture using the same principle of tool propulsion as the hydraulic handpiece described in 1953 by the author and co-workers.[1] It consists of a mobile cabinet which contains a motor, a constant volume pump and a water reservoir and a low voltage relay. No plumbing connections are required for the operation of this unit. It operates from any standard electrical outlet. The foot switch which controls the operation of the handpiece is energized by the low voltage relay. Water is pumped from the reservoir through a small high pressure tubing to the handpiece where it rotates a small turbine mounted in two precision plastic bearings located in the head of the handpiece. The torque or turning power of the turbine handpiece can be adjusted by a bypass valve (Fig. 1, right). The total torque developed by the instrument is more than adequate for the proper use of any cutting tool. When desired, the torque can be reduced by opening this valve. This procedure is helpful when operating on children who might bite or close on the handpiece. The reduced torque allows the tool to stop immediately and automatically, thus avoiding any danger of overcutting as may occur with the belt handpiece or with the excessive speed of air propelled turbines. Both plastic bearings and the turbine are quickly and easily removable for replacement (Fig. 2). There is no maintenance involved with any part of the unit other than the replacement of the plastic bearings when worn and the replenishment of the water in the reservoir as required.

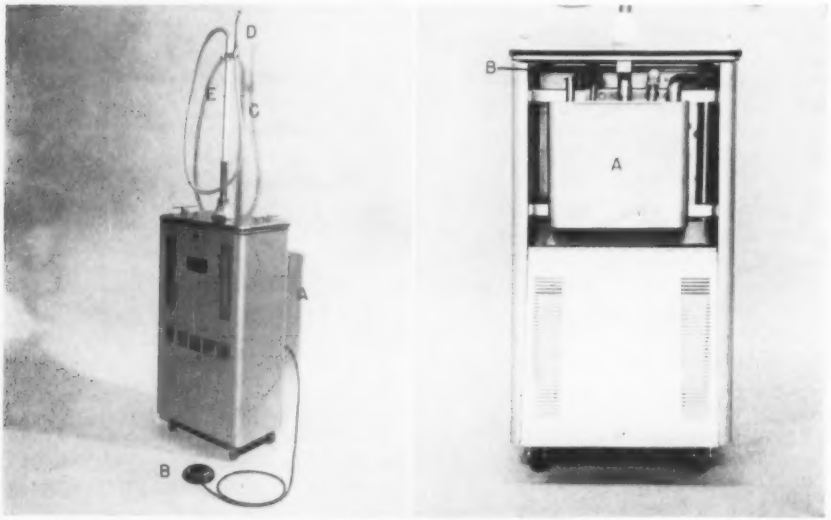

Fig. 1 • Left: Turbo-Jet dental unit. A. Cabinet containing motor, hydraulic pump, and 6 volt relay system. B. Foot control switch. C. Coaxial high and low pressure tubing. D. Contra-angle turbine handpiece. E. Flexible arm for support of tubing. Right: A. Water reservoir. B. Bypass valve which controls amount of torque produced by handpiece.

The bearing life depends on the manner of use of the instrument. In normal use the bearings last two or three months. Their replacement cost is very low.

The diamond instruments are attached by means of a special tapered and threaded fitting which assures perfect axial alignment of the tool and locks it directly to the turbine. The diamond cutting tools can be attached and removed quickly from the turbine. The useful life of the diamond tools is considerable because of the positive fit to the turbine and the absence of "wobble" of the tool during operation.

Instruments • Only ten diamond coated instruments (Fig. 3, left) are required in the technics for all the various cavity and crown preparations with the Turbo-Jet. The only tungsten carbide tool which is used is a precision-made, tapered, cross-cut fissure bur 701. This tool is used only for the removal of gold restorations and for no other purpose. Carbon steel hand instruments, double-end, Ferrier design (Fig. 3, right) are used for the final refinement of the preparation. Very sharp small size steel burs may be used at very slow rotational speeds for small internal refinements in Class III and posterior Class V cavities. Round steel burs may be used instead of hand instruments for the careful removal of deep decay. The selection of diamond tools shown in Figure 3, left, is adequate for 95 per cent of all cavity preparations requiring tooth reduction with rotary abrasive tools.

TOOTH PREPARATIONS

Class I Cavity Preparation • All Class I and Class II cavities are opened and extended with a single cylindrical diamond tool. In the Class I cavity the short cylinder usually is selected. No. 24s is used for bicuspids and deciduous molars and no. 24 for larger permanent molars. However, large disk wheels can be used if desired.

Initial Tool Position • The tool is positioned in a groove on the tooth in such a manner as to provide as much initial contact of the tool and the tooth as possible (Fig. 4, above left). Since the tool-tooth contacting area is extremely small

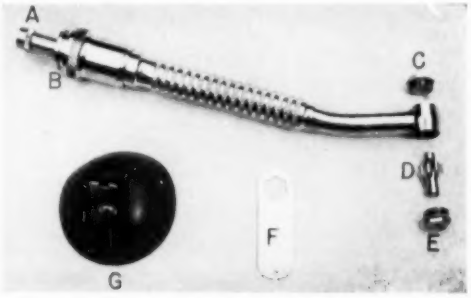

Fig. 2 • Details of contra-angle handpiece. A. High pressure tubing connection. B. Return tubing connection. C. Tapered plastic bearing fitted into top cap. D. Turbine. E. Tapered plastic bearing bottom cap. F. Wrench for removal of bearing caps and holding small diameter tools for locking into turbine shaft. G. Wrench for holding turbine shaft. Parts C, D and E are supplied by manufacturer as a unit replacement. (Manufacturer has eliminated need for G and F by quick release mechanism in turbine (D).)

at this time, the entry of the tool into the tooth is attained by allowing the diamond to seat itself almost of its own accord. Absolutely no attempt should be made to hurry or force the tool into the tooth. This is the most critical point of the entire technic. If too much pressure is placed on the tooth at this time, the diamond particles will imbed themselves totally into the tooth causing frictional heat, undue stress on the particles with the likelihood of knocking them from the tool and thereby denuding the tool. Excessive pressures are easily developed on the diamond tool (Fig. 5). The operator must remind himself constantly that the cutting rate of the tool is very low at the beginning and is totally dependent on the number of the diamond particles which can function. As soon as the tool

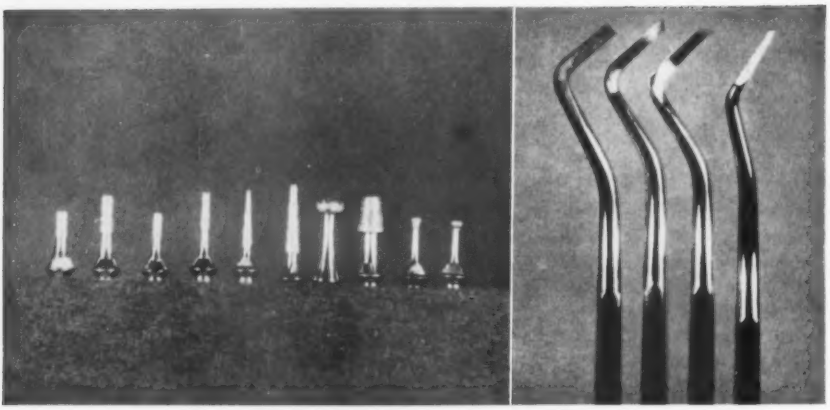

Fig. 3 • Left: Basic selection of diamonds. 24, 23, 24s, 23s, 31s, 31, 25, 31L, 30s, 38s. Right: Most useful carbon steel hand instruments. Ferrier design, double end. Hatchet, gingival margin trimmers, monangle chisel

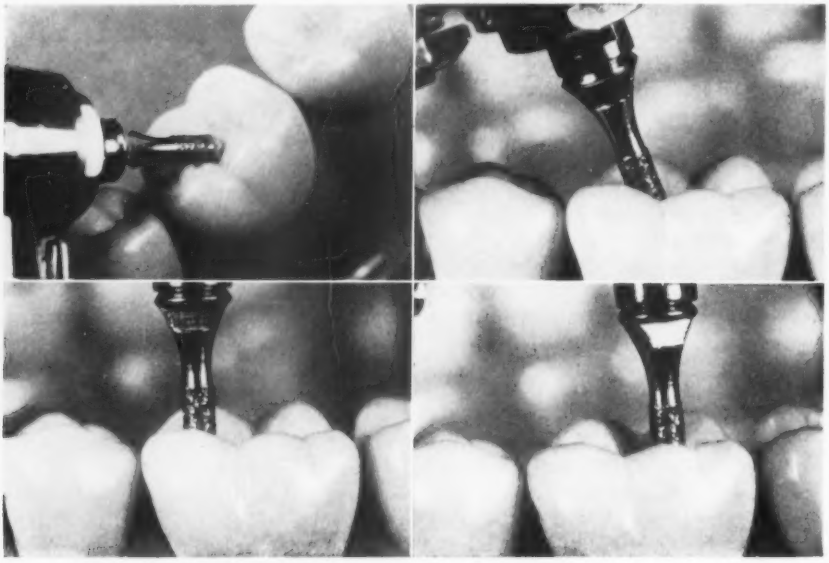

Fig. 4 • Tool positions for Class I cavity preparation

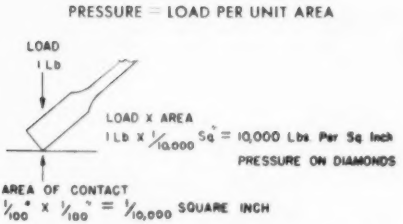
PRESSURE = LOAD PER UNIT AREA
LOAD
1 LB
LOAD X AREA
1 LB X 1/10,000 Sq" = 10,000 Lbs. Per Sq. Inch
PRESSURE ON DIAMONDS
AREA OF CONTACT
1/100" X 1/100" = 1/10,000 SQUARE INCH

Fig. 5 • When initial contact area of tool and tooth surface is small, even a very light load placed on diamond particles can fracture them easily from the tool.

seats itself into the tooth and more diamond particles are brought into function, the tool will cut with increasing speed and efficiency. The operator must subjugate his wishes to the capacity of the tool at all times.

The side of the cylinder is held against the tooth until it penetrates to a point just short of the desired occlusal depth (Fig. 4, above right). The entire contra-angle and tool are then rotated about an axis which is located at the junction of the tool with the turbine shaft (Fig. 4, above right). This arc-like motion places the tool in the final cutting position (Fig. 4, below left); that is, with the shaft parallel with the long axis of the tooth. The tool is held at the proper occlusal depth as the extensions of the preparation are completed (Fig. 4, below right). The side of the tool only is used for cutting; never is the edge or the base of the tool used. The tool is always moved in a radial direction, never in an axial direction (Fig. 6).

Class II Preparation • The Class II cavity preparation is made very simply by a continuation of the initial occlusal opening (Fig. 7). The same tool is brought just inside the marginal ridge at the same depth as the occlusal portion (note Fig. 7, above). The interproximal reduction is accomplished by an arc-like movement of the tool alternately from the buccal to the lingual. Depending on the buccolingual width of the tooth, this motion is about 10 to 20 degrees to each side. Again, the center of rotation for this tipping action must be at the junction of the tool and the turbine shaft and never at the end of the cutting tool (note Fig. 7, below). The proper motion causes the side of the tool to cut in a linguogingival direction as it starts to penetrate the interproximal region. When the tool has moved two thirds of the buccolingual width, the tool tips back to the vertical, in which position the last third of the buccolingual cut is made. This should bring the tool 1 or 2 mm. below the occlusal portion and well inside the final intended lingual extension of the cavosurface margin. In a reverse motion, the head of the contra-angle is tipped 10 to 20 degrees buccally and the side of the tool is caused to move in a buccogingival direction for about two thirds of the buccolingual width. The tool is again rotated as before so that the last third of the cut is made with the tool assuming a perpendicular position (parallel with the long axis of the tooth). The lateral motion of the tool is stopped well inside the final intended buccal cavosurface margin. These lingual and buccal motions of the tool are continued until the correct gingival depth of the cavity is developed. No attempts should be made to complete the buccal and lingual walls with the dia-

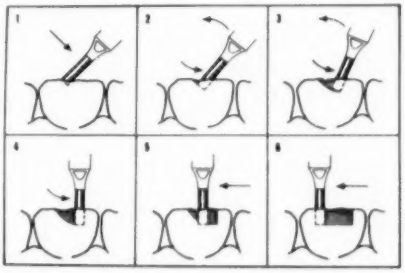

Fig. 6 • Motion of tool on entering occlusal surface.

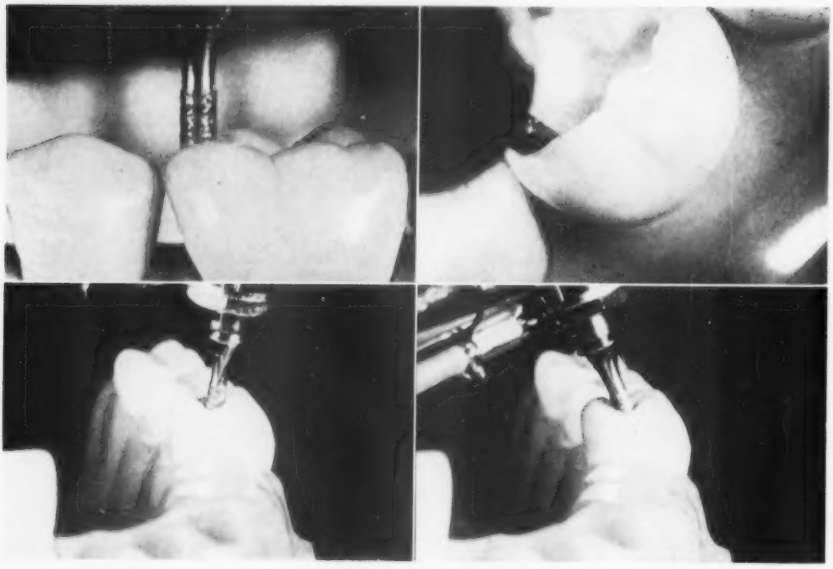

Fig. 7 • Class II cavity preparation

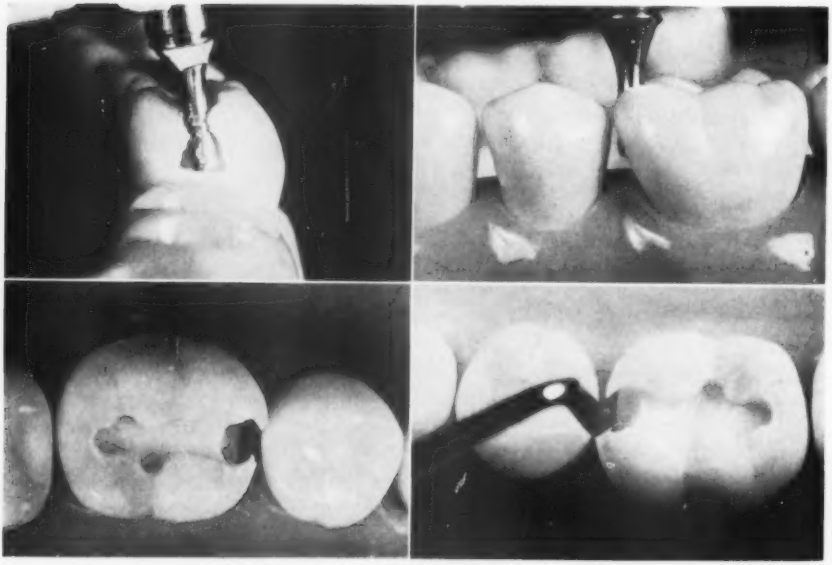

Fig. 8 • Class II cavity preparation

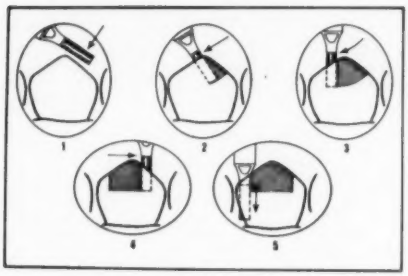

Fig. 9 • Motions of tool in development of Class II cavity. Arc-like motion of tool is not shown in step 5. All cutting is done with side of tool.

mond cylinder. In many instances the interproximal contact point will remain intact while the tool proceeds gingivally. There is very little danger of abrasion of the adjacent tooth if the motion of the tool is carefully maintained in a plane which is parallel, buccolingually, with the long axis of the tooth (Fig. 8, above left). The tool can be used as a depth gauge to determine the position of the gingival wall (Fig. 8, above right). Once the operator develops the proper motion of the tool he will have no difficulty in avoiding contact with the adjacent tooth (Fig. 8, below left, and Fig. 9).

The final extension and finish of the buccal and lingual walls are made with a 15-8-8 chisel or 15-8-14 hatchet as shown in Figure 8, below. Internal refinement of the preparation can be accomplished by changing the position of the instrument so as to create the proper box form and internal resistance and retention. The no. 15 gingival margin trimmer is used to place the desired bevel or slope to the gingival wall. Figure 10 shows the completed preparation.

Full Crown Preparation • One of the hazards of conventional full crown instrumentation is that it requires the use of large disks, which are extremely difficult to manage in the mouth.

Rotational speeds of 45,000 to 50,000 rpm eliminate the need for disks in all full coverage preparations and thus the patient's apprehension is relieved as is the tension and strain imposed on the dentist.

The same basic principles of sound diamond instrumentation apply in full coverage as in other preparations. The tool must not be hurried into the tooth at the beginning of the preparation. The path of the tool must be predetermined and a definite, positive passage of the diamond tool through the tooth must be maintained. Whittling or brushing the tooth in a random fashion extends the preparation time and deprives the operator of the advantages of a planned systematic method of tooth reduction.

The first step of the full crown preparation is the reduction of the occlusal aspect by the use of the diamond tool (31L) shown in Figure 11, above left. The side of the tool is rested on the lingual slope of the buccal cusps and the contour of the tooth is followed in reducing the vertical height by moving the tool mesially and distally. The diamond is then placed on the lingual slope of the lingual cusps and the reduction carried to the appropriate depth. The tool is placed on the buccal slope of the lingual cusps and they are reduced. Then the instrument is moved to the buccal slope of the buccal cusps to complete the occlusal reduction.

The second step is the preparation of

Fig. 10 • Completed Class II cavity preparation.

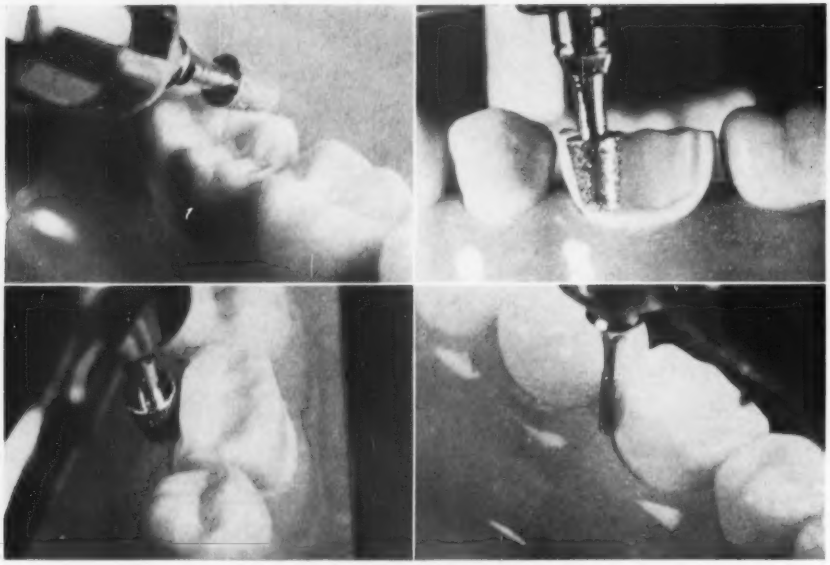

Fig. 11 • Full crown preparation

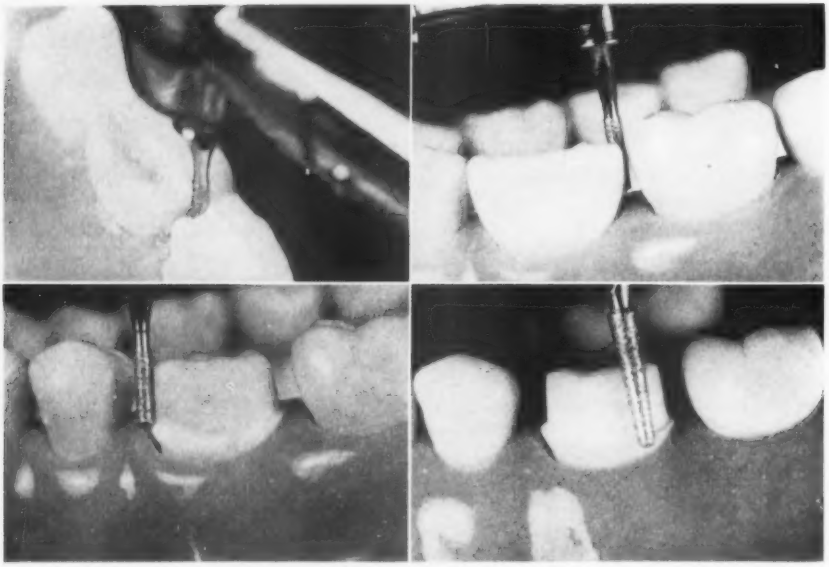

Fig. 12 • Full crown preparation

the buccal and lingual walls. The same tool (31L) is held just at the gingival margin on the buccal surface toward the distal. By sighting along the shaft of the tool it is very easy to establish the slope of this wall. This reduction is carried mesially (Fig. 11, above right). The reduction of the lingual wall is accomplished in the same manner (Fig. 11, below left).

The third step is the reduction of the mesial and distal surfaces. This is accomplished with a cylinder tool which is selected according to the length of the crown. The cylinder is positioned in the distal aspect of the previous lingual reduction (as illustrated in Figure 11, below right), and after making certain that the tool is properly aligned in its long axis and at the proper depth it is carried through the interproximal area just inside the contact point (Fig. 12, above left) until it intersects with the prepared buccal wall (Fig. 12, above right). The same method is used in the reduction of the mesial proximal wall (Fig. 12, below left). If, at this point, it is felt that the gingival margin should be reduced further toward the gum line or slightly below it, a tapered tool (31 or 31s) can be used. It will be noted that when the fine mesh diamond tools are used carefully and with the proper amount of water coolant, the gingival tissue is seldom abraded. This is because of the action of the water at the tip of the tool. It is thrown from the tool with sufficient centrifugal force to push the free margin of the gingiva away from the fine diamonds.

Removal of Caries, Cement, Amalgam, and Gold Restorations During Tooth Preparation • No particular regard need be given to the removal of carious tooth structure, cement or old amalgam restorations so far as the cutting action of the diamond instrument is concerned. It is considered undesirable to remove deep decay or deep cement bases which are in close proximity to the pulp with any fast cutting instrument. Either sharp carbon steel hand excavators or sharp round steel burs rotated very slowly in the belt and gear type contra-angle are the methods of choice.

Old amalgam fillings can be cut in the same manner as enamel with no clogging of the diamonds.

The removal of gold restorations can be accomplished very quickly with a no. 701 carbide bur. This tapered cross-cut fissure bur works very effectively in all types of gold. This is the only instance where a bur should be used at high rotational speeds.

COMMENT

The increasing demands for dental care have obligated the profession far beyond its present capacity. This inability of dentistry to meet its obligations will induce society through its government to impose restrictions, directions and subsidies. The profession must keep pace with these demands or lose the prerogatives it now holds. The development and adoption of equipment and methods designed to extend the ability and productive capacity of each dentist has significant social as well as economic importance to the profession. Such equipment and methods have been developed. Similar efforts in related fields are now in progress and will be reported subsequently.

Treatment of functional occlusal disharmonies

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In everyday practice, a dentist is faced constantly with problems of functional occlusal disharmonies in the masticatory system. Some of these problems might be stated best as questions:

1. Why do food impactions continue to occur, particularly in the molar and bicuspid regions, even though the contact points have been restored to good form with a normal or even greater than normal tension between teeth?

2. What causes disorders of the temporomandibular joints which produce soreness, lameness, clicking and crepitus?

3. With complete denture prostheses, why are there such wide variations in end results?

4. With complete denture prostheses, why has the use of immediate dentures become so acceptable? Why is centric relation not achieved even though it was copied faithfully from the occlusal position of the teeth?

5. Is it really within the ability of the dentist to "open the bite" or "close the bite"?

6. Why, after orthodontic treatment, do teeth drift from a position of good alignment, particularly in the lower arch with a resultant irregularity of the lower anterior teeth?

7. Why is there frequently such a noticeable improvement in the health of the periodontium after the removal of all teeth of the opposing arch?

8. Why, in the preparation of teeth for inlays, is it frequently necessary to remove a much greater thickness of tooth structure than is replaced by the gold restoration in its final dimension, which dimension is agreeable to the existing occlusion?

9. Why is there such a high incidence of fractured posterior cusps with no weakening by caries?

10. Why do porcelain jacket crowns fracture repeatedly in certain isolated instances?

These problems are of practical significance in the daily work of dentists. They all have at least one factor in common: the involvement of function of the masticatory system, or the dynamics involved when the parts of the masticatory system are at work.

For as long as there has been education in dentistry, more emphasis has been placed on the statics than on the dynamics or kinematics. It is simpler to study the statics of a situation than to study motion within a subject. If dentistry is to progress, more study must be made of oral physiology and functional anatomy so that the dentist will understand the function as well as the physical form and structure of each integral part.[1]

To understand the numerous problems of abnormality within the masticatory system, it is essential to define and to know the system. It can be enumerated briefly as follows:

1. McCollum, B. B., and Stuart, C. E. A research report: basic text for the postgraduate course in gnathology. School of Dentistry, University of California, South Pasadena, Calif., Scientific Press, 1955, p. 19.

1. The anatomic elements are the maxilla and mandible, the teeth and the periodontal tissues, the muscles of mastication, the infrahyoid and suprahyoid muscles, the tongue, the hyoid bone, the temporomandibular joints, blood vessels, the nerves, and salivary glands and lymphatic system, and all of the contiguous tissues.

2. All of the parts are interrelated and dependent on each other. The principal relationships between the component parts, (together with comment thereon), are as follows:

A. *Rest Position* • The rest position is a fundamental and dynamic position which exists as a result of tonal contracture of the musculature of the head and neck. It is important to recognize the hypertonicity or hypotonicity of the musculature which may affect this basic mandibular position. Disharmony of occlusion can induce hypertonicity. Fatigue or debilitating disease can induce hypotonicity.[2-4]

B. *Centric Position* (or, as suggested by the 1952 Nomenclature Conference of the American Dental Association, the *Median Occlusal Position*) • This position relates to the maxillomandibular relation when the component parts of the masticatory system are in harmony and the mandible has completed a functional closure movement.[3] An inharmonious median occlusal position, in other terms, is a deflection or an overclosure of normal mandibular movements. A harmonious median occlusal position is the ideal centric position.

C. *Vertical Dimension* and *Freeway Space* • The difference between the occlusal vertical dimension and the rest vertical dimension of the face represents the width of the freeway space or interocclusal clearance. Failure to respect normal freeway space requirements ultimately results in absorption of alveolar bone, strain, a tired feeling in the musculature, and pain.[5]

D. *Functional Movements* • Functional movements are those utilized in mastication, in deglutition, and in speech.

E. *Natural Physiologic Closure* • A natural physiologic closure produces in the normal mouth a harmonious median occlusal position. It is not closure from the most retruded position of the mandible nor is it a forcibly assumed distal position induced by the operator. It is closure guided by joints and activated by muscles in as near a normal state of muscle tonus as can be effected at the time of examination. It is well if there is a simultaneous contact of teeth in the median occlusal position after completion of natural physiologic closure. Pathologic closure of the mandible can change as treatment progresses and will simulate closure from rest position when the muscles and joints are normal.

The goal in treatment of problems of the masticatory system can be stated to be one of creating harmony, in function and at rest, of the various elements.

The adjustability of these various elements is limited. The greatest possibility of adjustment lies in the teeth since they can be shortened, moved to a new position, reshaped by restorative dentistry or removed. The occlusal plane and the occlusal vertical dimension can be adjusted. It is with these possibilities that this paper is primarily concerned.

2. Thompson, J. R. Rest position of the mandible and its significance to dental science. J.A.D.A. 33:151 Feb. 1946.

3. American Dental Association, Bureau of Library and Indexing Service. 1952 and 1953 nomenclature conferences. J.A.D.A. 46:324 March 1953.

4. Thompson, J. R. Temporomandibular disorders: diagnosis and dental treatment. In The temporomandibular joint, Sarnat, B. G., editor. Springfield, Charles C Thomas, 1951.

5. Thompson, J. R. Constancy of rest position of the mandible and its influence on prosthetic restorations. Manual of postgraduate course, April 1-3, 1953. Chicago, Northwestern University Dental School.

ADJUSTMENT OF TOOTH ELEMENTS

Adjusting the various tooth elements so that they harmonize has been termed occlusal equilibration. Its three main objectives are: (1) achievement of a simultaneous contact of mandibular teeth in a comfortable physiologic closure against maxillary teeth, with distribution of stresses against the teeth chiefly in an axial direction; (2) maintenance or restoration of the normal vertical dimension of the face, both rest vertical dimension and occlusal vertical dimension; (3) achievement of a reasonable balance in the lateral, protrusive and retrusive functional relations.

Disharmonies between the function of the teeth and function of joints can cause dislocation of and traumatic injury to the joints, or a displacement of the mandible to the anterior, posterior, right or left lateral, superior or inferior positions, or any combination of these;[2] or secondary symptoms of muscular discomfort and fatigue, headaches and numerous other symptoms which will be discussed later.

In examining the patients, the usual routine should be carried out, including use of roentgenograms. The following symptoms of perversion of occlusal balance should be looked for:

1. Lateral or vertical mobility of teeth.
2. Inflamed tissues and periodontal pockets.
3. Fractured cusps, particularly if there is no evidence of previous weakening by caries.
4. Vertical food impactions.
5. Uneven attritional pattern or absence of attrition.
6. Lost teeth.
7. Discomfort that can be described by the patient.
8. The slushy sound of tapping, or "double-tap" of the teeth on the path of physiologic closure.
9. Interference on natural physiologic closure to full occlusal contact. (This usually can be observed from directly in front of the patient and from right and left sides when the patient's lips are retracted.)
10. Headaches, particularly in the temporal region.
11. Muscular fatigue.
12. Thermal shock of the teeth.
13. Temporomandibular joint clicking, crepitus, or pain. (This symptom is commonly reported to the rhinologist and physician.)

In addition to these symptoms, the number, kind and position of dental restorations and any abnormal chewing habits should be noted.

On occasion, manual guidance must be given the patient to find the path of physiologic closure. This guidance is only to acquaint the patient with the objective position under examination.

CLASSIFICATION OF EQUILIBRATION

Equilibration within the masticatory system can be classified as follows:

A. Natural equilibration
1. Normal
   a. Occlusal and incisal attrition
   b. Proximal abrasion and mesial drift
   c. Continuous eruption of tooth elements
2. Abnormal
   a. Muscular hypertonicity
      1. Bruxism
      2. Clenching
      3. Cramps
      4. Grimacing
      5. Trismus
   b. Deviation of path of closure
      1. Joint disorders
      2. Tooth fractures
      3. Mandibular displacements
   c. Mobility of teeth

B. Artificial equilibration
1. Occlusal adjustment by selective grinding
2. Operative procedures; creating acceptable functional tooth forms and occlusal vertical dimension by operative restorations (inlays, onlays, crowns and bridges)
3. Prosthetic procedures; creating functional surfaces and an acceptable occlusal vertical dimension by prosthetic appliances (splints, partial dentures, complete dentures)

4. Orthodontic procedures; rearrangement of tooth elements to satisfy harmony of masticatory system components
5. Surgical procedures; removal of tooth elements or interfering bone elements

In the masticatory system, equilibration has existed as long as man or animals have had teeth in function. This is designated in the classification as natural normal equilibration and includes wear of occlusal and incisal surfaces, wear of proximal contacts, mesial drift and pattern of continuous eruption of teeth.

Abnormal natural equilibration represents all the perversions of function brought about by some disharmony as, for example, muscular hypertonicity, revealing itself as (1) bruxism, clenching or muscular fatigue, or (2) deviation of the path of closure which is manifested by a dislocation of the temporomandibular joint, a fractured cusp of a tooth, or a mandibular displacement, or as mobility of teeth, as from an interceptive contact with the consequent overloading of stresses.

Artificial equilibration procedures are those developed and exercised by human effort.

REPORT OF CASES

The following case reports are included to illustrate some of the clinical applications of artificial equilibration to eliminate functional occlusal disharmonies.

Case 1 • The patient was a 34 year old man who complained of pain in both temporomandibular joints with a shooting pain up over the eyes, which was greater on the right than on the left side, frequent headaches and muscular fatigue in the masseter muscle regions (Fig. 1).

Treatment of occlusal disharmony by selective grinding required three weekly appointments. Within two weeks after treatment, all symptoms subsided.

Nine months later the lower right first and second molars were restored with mesiooccclusal fillings. Within two weeks the patient came to the office and said that his original symptoms were starting to return and that he was experiencing thermal shock in the newly restored molars. Reduction by occlusal adjustment of an abnormally high spot on the new amalgam in the second molar relieved him within hours of the gross symptoms and in two days of the thermal shock. The original periodontal involvement had responded favorably.

Case 2 • The patient reported that the symptoms in the left temporomandibular joint had started during a noonday meal four weeks prior to coming for treatment (Fig. 2). Examination disclosed a crepitus that could be felt through the mandible during physiologic closure. The patient's chief complaint was that the left joint was sore during mastication, more so when masticating on the right side than on the affected left side. Splinting gave immediate relief.

With this patient, the initial contact of the right bicuspids and cuspids and molars was made after the mandibular teeth had passed through the freeway space. The mandible on further closure then followed the guidance of the lingual slope of the upper cuspid, the mesiolingual slopes of the lingual cusps of the first and second bicuspids and the lingual slope of the buccal cusp of the upper right third molar, and deflected off to the left.

Mandibular deflection is most easily noted by careful observation of the midline of the upper and lower dentitions; it is one of the cardinal diagnostic signs in functional analysis. It is often not discernible unless physiologic closure is performed slowly and repeatedly. In general, treatment should be instituted to move the lower midline away from the affected joint. In this instance, it was moved to the right from its inharmonious median occlusal position, or the harmonious median occlusal position was established at an acceptable level and before the

mandible was deflected to the left.

A temporary acrylic splint was used to achieve this objective and adjusted to static and functional requirements by occlusal adjustment.

Ideally a lower fixed bridge restoration on the right side and inlay-onlays on the lower left posterior teeth would be indicated in such instances. Selective occlusal grinding was avoided because to effect a simultaneous contact of teeth in median occlusal position would have required too great a loss of tooth structure. Also it was contraindicated because it

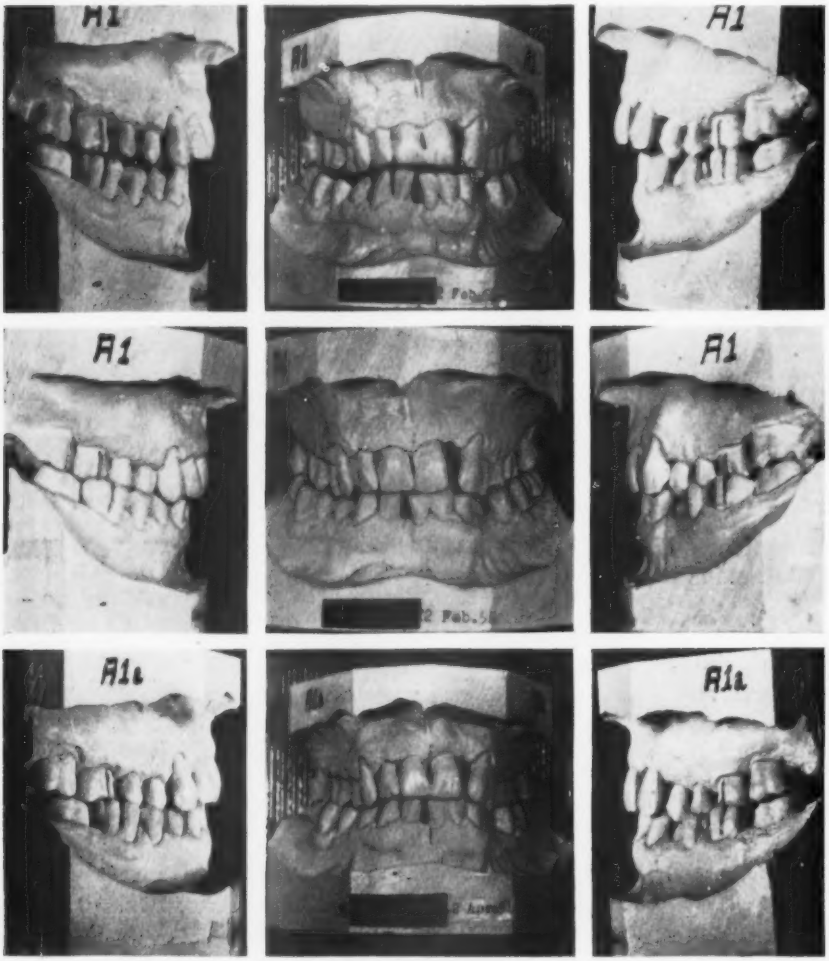

Fig. 1 • Case 1. Artificial equilibration by selective grinding. Top row: Original models mounted on correlating board at the first point of contact on natural physiologic closure. Middle row: Same set of casts in inharmonious median occlusal position. Bottom row: After treatment models: median occlusal position of teeth is in harmony with muscles, joints and the rest of the masticatory system.

would have decreased the occlusal vertical dimension of the face.

Case 3 • A 22 year old girl, having completed orthodontic treatment five years previously, came to the office with a complaint that the upper left lateral incisor was rotating mesially and irritating her lip and that at times it felt mobile (Fig. 3). Some grating in both temporomandibular joints was experienced occasionally. Examination revealed some obvious interferences of the teeth in median occlusal position, in balancing occlu-

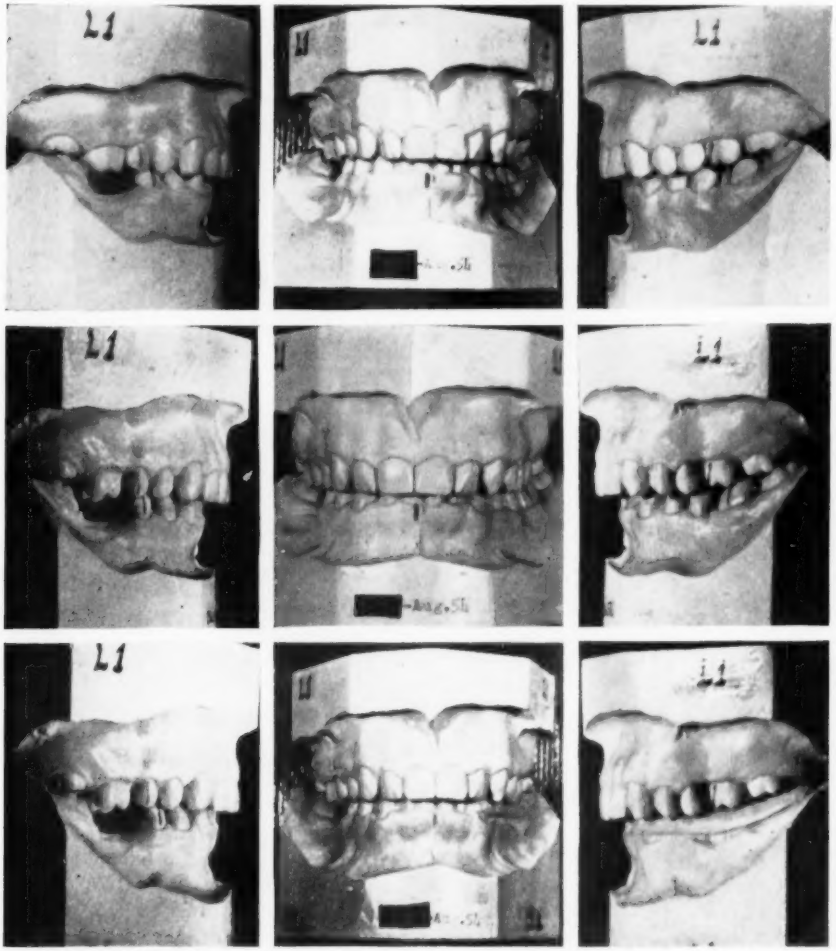

Fig. 2 • Case 2. Artificial equilibration capable of being treated by operative procedures. Top row: Original models showing first point of contact on physiologic closure. Middle row: Same casts in inharmonious median occlusal position before treatment. Bottom row: Temporary treatment splint on left side only, to identify disharmony and give dimension of amount of operative restoration necessary for more permanent restoration of occlusal level.

sion in the second molar regions on both sides, and some obvious interferences in protrusive relations.

The occlusal imbalance had not necessarily been present when the orthodontist had completed treatment five years previously. The retention appliances he had utilized, however, and the subsequent self-adjustment had not given the patient the comfort that she desired. Occlusal equilibration by selective grinding here provided comfort and balance in two months' time.

Orthodontic treatment should be planned to insure a normal comfortable median occlusal position from physiologic closure. Median occlusal position can be guarded by some selective grinding during the retention period and finally balanced in detail at the end of the retention period. An equilibrated occlusion and effective retention should be integrated with each other.

Case 4 • This case report is included to illustrate artificial equilibration by a prosthetic procedure.

In order to effect a contact of occlusal surfaces, this 18 year old boy was forced to an abnormal functioning of the mandible in protrusion ond overclosure as shown by the occlusal position of the casts (Fig. 4). When given the opportunity to function at the level of the first point of contact by use of a prosthetic appliance, the masticatory system immediately revealed that this was the natural physiologic path of closure and one of harmonious function. The patient immediately accepted this position as the most comfortable functional position after having masticated with the teeth in protrusion and overclosure since childhood.

Temporary acrylic splints were worn for four weeks to satisfy both the operator and patient that the occlusal functional position was adequate. The occlusal level, one proved comfortable and acceptable, was determined by the musculature and joints, not by arbitrary judgment of the operator. If a restoration of occlusal level can be achieved on a temporary basis with acrylic splints, the operator can be assured of end results in the permanent restoration by a complicated procedure of inlays-onlays, crowns, bridges, and partial dentures.

Case 5 • With this patient, artificial equilibration could be achieved by the use of surgery (Fig. 5). Often, artificial equilibration by extraction is unknowingly employed. In this instance, if the teeth of the upper arch had been removed because of advanced periodontal disease, equilibration of occlusion would be automatic. The mandible could then function in its normal median occlusal position instead of the protrusive position as shown in the bottom row of casts.

Often, a mandible that has been displaced by third molars in overeruption has subsequently been equilibrated by extraction unknowingly.

The registration of the occlusal position (bottom row of casts) as the harmonious median occlusal position (centric) obviously would be in error as this is an inharmonious median occlusal position. Removal of the upper teeth for an upper denture was indicated and in this instance would effect occlusal equilibration sufficient to allow harmonious median occlusal position on physiologic closure. In preparing for an immediate denture prosthesis, failure to examine the path of physiologic closure can result in a false registration of median occlusal position and an improper occlusal vertical dimension.

DISCUSSION

In the case reports discussed herein, the occlusal disharmonies are grossly noticeable. More frequently, a lesser degree of disharmony is present. In some of these instances, those in which the condition is mildest, the equilibration of a single cusp may effect a result. For the most part

illustration of occlusal disharmonies is difficult because of its very nature—it is a dynamic entity. The minor disharmonies may produce more discomfort than some of the gross disharmonies (as, for example, in vertical food impactions). With other patients, the reduction of disharmony is the first sign the patient has

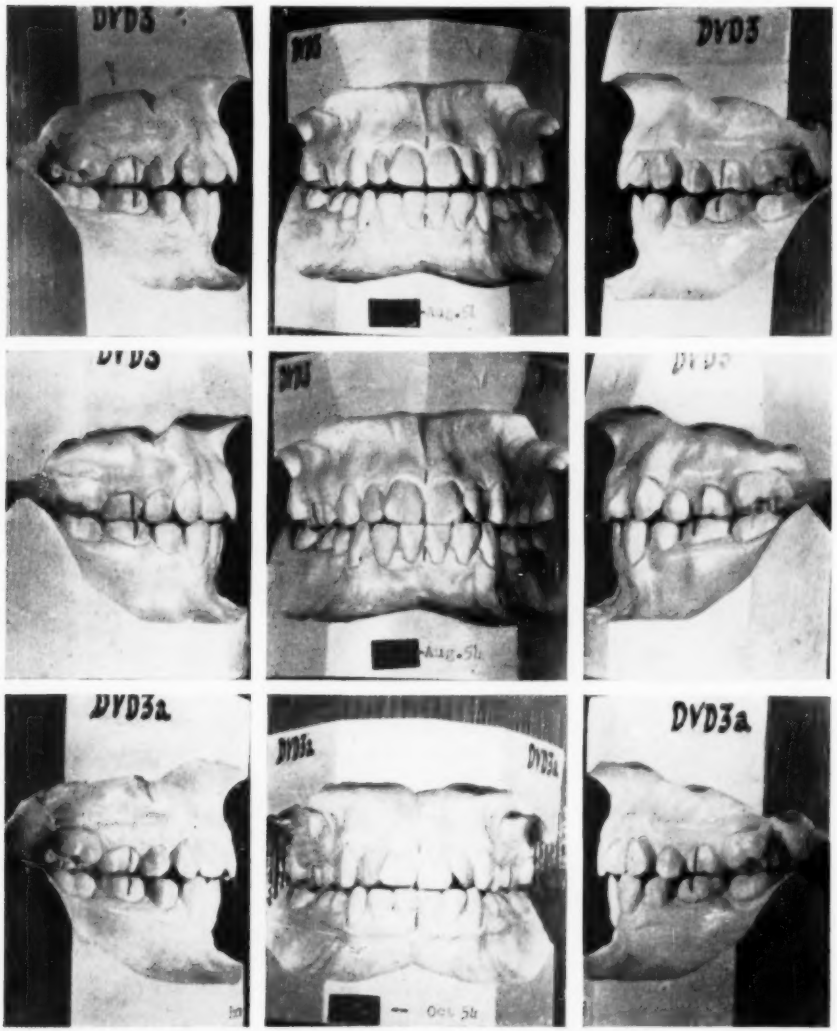

Fig. 3 • Case 3. Artificial equilibration by selective grinding. Top row: Original models exhibiting first point of contact on physiologic closure. Middle row: Same casts in original inharmonious median occlusal position before treatment. Bottom row: Harmonious median occlusal position on physiologic closure

had that a disharmony was present. It is the dentist's obligation to be able to recognize and correct disharmonies of all parts of the masticatory system.

Artificial occlusal equilibration by selective grinding is achieved most effectively by following the precepts of Clyde Schuyler.[6,7] He offers a solution to a problem routinely found during equilibration in the same mouth from year to year. To balance each single restoration —an inlay, an amalgam filling, a fixed bridge or a partial denture—Schuyler's method of occlusal equilibration proves invaluable. The patient's gratitude for

6. Schuyler, C. H. Adjustment of occlusal disharmony by grinding. Manual, Occlusion in periodontal practice, University of Illinois, February 8-9, 1951.

7. Schuyler, C. H. Fundamental principles in correction of occlusal disharmony, natural and artificial. J.A.D.A. 22:1193 July 1935.

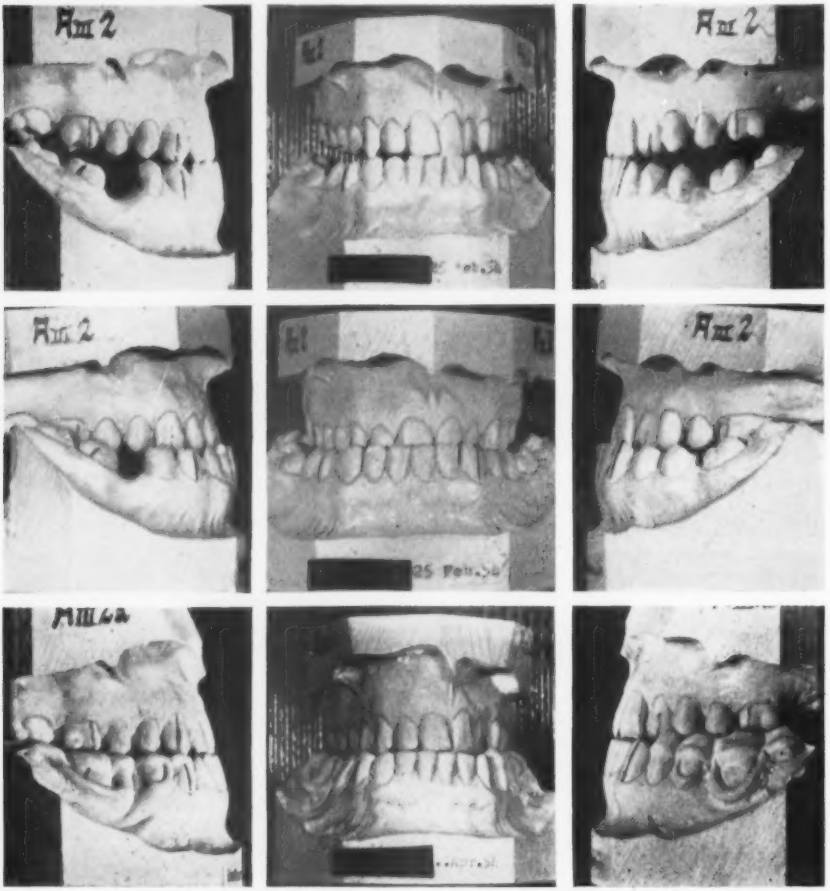

Fig. 4 • Case 4. Artificial equilibration by prosthetic procedure. Top row: Original model showing first point of contact on physiologic closure. Middle row: Same casts showing inharmonious median occlusal position. Bottom row: After treatment casts illustrating harmonious and comfortable median occlusal position at acceptable occlusal level.

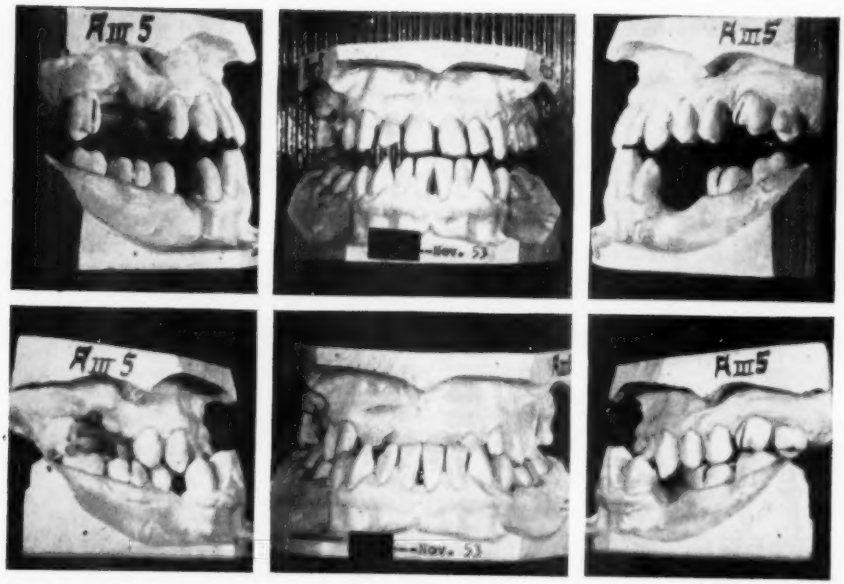

Fig. 5 • Case 5. Illustration of need of artificial equilibration by surgical means. Top row: Model at first point of contact on physiologic closure. Bottom row: Inharmonious median occlusal position used by patient in functional occlusal relations.

occlusal comfort will reward the operator for his efforts.

It is common for patients who have been receiving routine care to acquire areas of irritation from vertical food impactions even though a tight, well contoured, contact point is supplied. When this happens, it is a functional disharmony that momentarily drives the two teeth involved away from each other long enough for the tougher fibrous foods to be caught at the point of contact or forced beyond it to impinge on the gingiva. On analysis, interceptive contact on an inclined plane of one or more of the cusps of the involved teeth is found to be the offending contact.

In planning for a complete denture prosthesis, the determination of vertical dimension should come from the masticatory system under treatment. To determine vertical dimension arbitrarily on the basis of a high or low alveolar ridge, the overeruption of certain teeth, the abraded appearance of natural teeth, or the sunken appearance of the lips is an unphysiologic approach.

Vertical dimensions, rest and occlusal, can be measured externally if care is exercised not to disturb movable tissues or cause tension of masticatory muscles.

If occlusal equilibration of the masticatory system is to be rendered to all dental patients, numerous hours cannot be expended in registering the hinge axis and all mandibular movements on an articulator in every instance. The time factor does not permit this. The profession is deeply indebted to those who have generously spent time and money in perfecting accurate reproduction of masticatory function. Researchers, using such detailed technics, have furnished proof of facts useable in daily practice. In everyday practice, however, knowledge must be gained from the patient's own masti-

catory system *in situ*. For the purposes of this study, the relations of maxillary teeth to mandibular teeth were registered on a static basis, as follows:

1. First point of contact on physiologic closure as existing in the patient.
2. Inharmonious median occlusal position of the upper and lower teeth.
3. After-treatment relations showing harmonious median occlusal position.

These positions were recorded accurately with plaster cores and provided a positive record of the existing disharmony so that results of treatment could be compared.

CONCLUSIONS

1. Diagnosis based on the natural physiologic closure of the mandible is related to all phases of dentistry. It involves both a static and a functional approach to the solution of dental disorders and leads to closer observation of maladies on a basis of oral physiology.

2. In physiologic closure a harmony should exist between the various components of the masticatory system. Numerous symptoms in patients are associated with incompatibility of the various elements of the masticatory system.

3. Only a very slight discrepancy in the occlusal relations of the upper and lower arches can induce aggravating symptoms.

4. In contouring single fillings or multiple occlusal restorations, the rendering of an acceptable functional tooth surface is essential. If undercontoured, the restoration may contribute to overclosure at a later time. If overcontoured, it may contribute to trauma.

5. Instructing the patient "to bite" or to "bring the teeth together" does not insure registration of harmonious median occlusal position (centric position) unless there are no occlusal disharmonies.

6. Occlusal disharmonies and mandibular displacements are common occurrences. Their elimination is important to the longevity of any dental treatment and to the practice of preventive dentistry.

7. The younger as well as the older patient has been found to have numerous occlusal disharmonies.

8. The oral physiological principles provided by dental research[1-9] have a practical application in daily work.

9. Functional analysis as well as static analysis is essential to progress in the biochemical art designated as dentistry.

10. Arbitrary determination of any dimension of the masticatory system, whether it be the occlusal position (centric) or reproduction of tooth form or position, in the execution of operative, prosthetic, orthodontic or surgical dentistry is to be discouraged as it induces failures. Specifically, this means that manual correlation of models "where they fit together" does not necessarily record centric position and is an unreliable practice. Also, an arbitrary guess at proper occlusal level (formerly called "opening the bite") frequently leads to violation of the vertical dimension and subsequent failure. The final occlusion gained through orthodontic treatment will fail unless requirements of functions are satisfied, and the occlusion must be comfortable and compatible with all masticatory system components. Occlusal adjustment by selective grinding is guided by functional activity in the masticatory system and is an orderly, detailed, and effective procedure in the treatment of functional occlusal disharmonies.

724 New York Avenue

8. Boos, R. H. Occlusion from rest position. J. Pros. Den. 2:575 Sept. 1952.

9. Granger, E. R. Functional relations of the stomatognathic system. J.A.D.A. 48:638 June 1954.

A comparison of the properties and uses of silicate cement and acrylic resin in operative dentistry

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One of the many laudable aims of the dental profession is to provide dental restorations that are pleasing in appearance. The esthetic quality of a restoration may be as important to the mental health of the patient as the biological and technical qualities of the restoration are to his physical or dental health.

The esthetic qualities of an artificial denture can be brought to the point that the substitute cannot be detected. At the same time, the physical properties and service of the appliance can be at least adequate.

In the search for similar esthetic qualities, silicate cement and the acrylic resin filling materials have been employed by the operative dentist. The operative dentist has not been as successful to date in his search for an esthetic material as has been the prosthetist. Neither the best silicate cement restoration nor the best acrylic resin filling can be said to approach the permanent qualities of a superior acrylic resin denture from an esthetic and service standpoint. Unfortunately, neither filling material is as satisfactory from a service standpoint as are most of the nonesthetic restorative materials employed in operative dentistry. Consequently, any discussion of either filling material should be tempered with reservations from the start as to their relative merits under any conditions.

Granting, however, that both the silicate cements and the acrylic resin tooth restorative materials lack certain properties which may be basic to success, it is possible that the quality of the restoration can be impaired by improper technics, by ignorance of the basic reactions involved, and by a failure to interpret the physical properties correctly in reference to the indications for the use of the material and the design of the cavity preparation.

Consequently, it is the purpose of this discussion to evaluate the technics involved in terms of the physical properties desired. The silicate cement restoration will be compared with a similar restoration made with acrylic resin in relation to the possible service of each as indicated by their respective physical and chemical properties.

SILICATE CEMENT

Composition • The powders consist primarily of silica (SiO_2), alumina (Al_2O_3), lime (CaO) and flux. The preferable flux is some form of a fluoride such as sodium fluoride (NaF), calcium fluoride (CaF_2),

Presented as part of a panel discussion, "Indications for and use of the various restorative materials," ninety-eighth annual session, American Dental Association, Miami Beach, November 6, 1957.

Professor of physics, Northwestern University Dental School.

cryolite (Na_3AlF_3) or combinations.[1] Other fluxes which can be used, but not as satisfactorily, are sodium carbonate (Na_2CO_3) and beryllium silicate (Be_2SiO_4).[2]

At one time the presence of fluorides was thought to be a possible cause of pulp damage under silicate cement restorations,[3] but with the advent of the modern theories of caries control by fluoridation, such speculations appear to be no longer valid. In fact, it was demonstrated recently that the presence of the fluoride flux actually decreases the solubility of the enamel adjacent to the restoration.[4] Certainly it has been shown that the fluoride flux improves the physical properties of the set cement when these properties are compared with those of other fluxes known to have been employed.[1]

The remaining ingredients, silica, alumina and lime are balanced as a factor in the control of the setting time.[2] In practice, the various ceramic ingredients are fused together and ground into a fine powder, as received by the dentist.

This fine powder is a slightly alkaline fusible glass which reacts with the liquid, the liquid being a buffered solution of orthophosphoric acid. The exact composition of the acid liquid is somewhat critical in relation to its concentration. It is imperative that the dentist protect the liquid at all times from losing water to the air, or from absorbing moisture hygroscopically.

Mixing Powder and Liquids • The mixing procedure consists in bringing the powder particles into contact with the liquid so that the chemical reaction can proceed.

In order to appreciate the significance of the mixing operation, it is necessary to understand the reactions which occur. The acid attacks the glass particles to form silicic acid ($Si(OH)_4$). When the proper acidity is attained, a gel is formed. It is this gel which forms the matrix of the finished fillings and the control of its formation and its preservation are the main objectives of the entire procedure.

The structure of the gel is conceived of as being a network of silica molecules. In this network are held the molecules of water and presumably the molecules of the buffering agents, as well as any excess acid which did not combine chemically in the reaction. The reaction does not go to completion; that is, not all of the particles are dissolved. About 10 per cent of the particles are dissolved before the reaction is limited.[5] The final structure consists of the undissolved powder particles as a core suspended in a matrix of gel.[1]

The proper structure of the final product is of utmost importance to the success of the silicate restoration. One of the acknowledged faults of such a restoration is that it gradually washes out in the mouth fluids. The process is one of erosion since the gel matrix dissolves in the mouth fluids from around the core and thus the residual cement particles are washed away. The silicate cement powder is about half as soluble as is powdered tooth enamel.[6] It is because of the gel matrix that the Council on Dental Research of the American Dental Association required that the solubility of a silicate cement should not be greater than 1.4 per cent by weight in distilled water.[7]

1. Paffenbarger, G. C.; Schoonover, I. C., and Souder, W. Dental silicate cements: physical and chemical properties and a specification. J.A.D.A. & D. Cosmos 25:32 Jan. 1938.

2. Manly, R. S., and others. Effect of composition of liquid and powder on physical properties of silicate cements. J.D. Res. 30:145 Feb. 1951.

3. American Dental Association, Council on Dental Therapeutics. Report on plastic materials. J.A.D.A. 18:2012 Oct. 1931.

4. Phillips, R. W., and Swartz, M. L. Effect of certain restorative materials on solubility of enamel. J.A.D.A. 54:623 May 1957.

5. Souder, W., and Schoonover, I. C. Probable chemical reactions in silicate cements. (Abst.) J.D. Res. 18:250 June 1939.

6. Souder, W., and Paffenbarger, G. C. Physical properties of dental materials. Washington, D. C., Government Printing Office, 1942, p. 120.

7. Paffenbarger, G. C., and Sweeney, W. T. American Dental Association specifications for dental materials. Chicago, American Dental Association, 1956, p. 38.

It follows, therefore, that as much powder should be combined with the liquid as possible so that the amount of gel formed will be at a minimum. In other words, the set cement should contain as many powder particles as possible, held together by the least amount of gel possible; only enough to insure that every particle is surrounded by the gel matrix material.

Consequently, during mixing, the cement powder should be "folded" into the liquid, and not spatulated by rubbing as is done with a zinc phosphate cement or a zinc oxide-eugenol impression paste. The latter method is not beneficial for a silicate cement, and may be harmful because of the danger of incorporating particles abraded from the mixing slab and spatula. With proper spatulation, every particle will be wet with the liquid. The operator should continue to add the powder so long as it can be wet with the liquid until a putty-like consistency is obtained.

Setting Time • There are a number of factors which influence the setting time of a silicate cement, aside from the composition of the liquid and powder, a factor which is not under the control of the dentist except as impurities or a change in chemical balance may be brought about by mishandling.

In the light of the foregoing discussion of gel formation, it is evident that the setting time must be sufficient to allow the mixing to be completed, the prepared cavity to be filled and the matrix strip applied before the gel forms. If the gel is disturbed or fractured during its formation, the restoration will disintegrate rapidly and will be unsightly in appearance.

The rate at which the powder is added to the liquid is not particularly significant, but the instructions of the manufacturer should be followed.

The most practical way for the dentist to control the setting time of a silicate cement is by a regulation of the temperature of the mixing slab. A thermometer incorporated in the slab is helpful.

A convenient type of mixing slab is a square, flat-sided bottle containing water at a specified temperature as indicated by a thermometer inserted through a rubber stopper. The use of water to regulate the temperature of the mixing slab is logical. Because of its relatively high specific heat, the water will maintain a more constant temperature in the slab than will any other slab material.

The rule is that the lower the temperature of the slab, the slower is the chemical reaction and, therefore, the slower the formation of the gel. It can be reasoned, then, that the lower the temperature of the mixing slab, the more powder can be incorporated into the gel before the setting reactions progress too far.

Again, it should be noted that every possible opportunity should be taken during the mixing procedure to increase the amount of powder and thereby lessen the total volume of the more soluble gel matrix. In a properly mixed silicate cement, as much as 80 per cent of its volume may consist of undissolved particles or core with the gel matrix occupying 20 per cent of the total volume.

Unfortunately, the use of a cool slab is not always possible. If the temperature of the slab is below the dew point of the room, moisture will collect on the slab. As previously noted, the chemical composition of the liquid is extremely critical, and the introduction of water at any stage of the reaction produces a deleterious effect on the physical properties of the restoration. Oftentimes in hot, humid weather, the dew point may be at such a high temperature that the slab cannot be cooled sufficiently. In such a case, the dentist should either dismiss the patient until the weather is more propitious, or else install an air conditioning unit in the office.

A third alternative is to mix the cement in a closed container as suggested by

Grunewald and co-workers.[8] A thin walled, paddle-shaped toy balloon is cut crosswise, approximately one inch from the open end. A weighed amount of powder is sealed inside. The liquid is stored in a small serum bottle with a self-sealing rubber stopper. The proper amount of liquid is removed from the bottle with a tuberculin syringe and is transferred to the sealed balloon containing the powder. The balloon is then kneaded between the fingers under water, cooled to the proper temperature. The proper mixture of powder and liquid is thus obtained regardless of the dew point. The balloon is cut open, and the mixture is used at once.

Insertion • The field of operation should be kept dry. Any water contacting the cement at this stage will definitely reduce or eliminate the desirable esthetic and physical properties of the restoration. The cavity walls should not be desiccated, however, since the water balance of the cement liquid may be disturbed by absorption, not to mention the danger to the pulp caused by the possible absorption of acid.

The mixed cement is carried to the prepared cavity in very slight excess. The cement should then be placed under pressure immediately before the gel forms. During the mixing of the cement, it is virtually impossible to prevent the incorporation of air. One of the benefits of the application of pressure at this stage is the condensation of the small air bubbles so entrapped.

Usually the cement is compressed by means of a tightly-drawn celluloid strip matrix. It is most important that the pressure, however it is applied, be held rigidly until the initial set (approximately three minutes) has occurred. The slightest movement of the matrix at this stage may fracture the gel as it forms. Since a checked, crazed or cracked gel will not reform, the resulting restoration will be weak; it will disintegrate more rapidly, discolor and generally deteriorate.

Finishing • After the celluloid strip matrix has been removed, any sharp edges on the restoration can be corrected, but it should be covered with some type of a film impervious to water as soon as possible. A low fusing wax may be best, although cocoa butter or varnish is often used. The coating should remain for 3 to 4 hours at least.

The purpose of the coating is to prevent the water from the saliva contacting the gel at the early stage. If the restoration is allowed to absorb water within 2 to 4 hours after the insertion of the silicate cement, a soft, chalky, nontranslucent surface results. If the cement loses water, it has the same effect. In fact, if the silicate cement restoration is allowed to dry at any time, a contraction takes place which is accompanied by a loss in surface hardness and in esthetic qualities.

The final polishing of the restoration should be delayed for at least 24 hours, or better, seven days or more, until the chemical reactions have more nearly approached chemical equilibrium. If the strip matrix had been properly adjusted, there should be little contouring or polishing needed. The most esthetic surface is obtained against the matrix, and any attempt to contour and repolish the restoration will result in a duller surface.

Care of Liquid and Powder • The critical nature of the chemical reactions involved and their effect on the dental restoration have been emphasized constantly throughout this discussion. The maintenance of the established chemical equilibrium in the liquid should be maintained at all costs.

The cement liquids contain a proper amount of water which must not be

8. Grunewald, A. H., and others. Silicate cement: method of mixing in a closed container to prevent effects of exposure to atmosphere. J.A.D.A. 46:184 Feb. 1953.

changed. If the vapor pressure of the liquid is less than that of the atmosphere, water will be taken up by the liquid. If the liquid vapor pressure is greater than that of the air, water will evaporate from the liquid. In general, if the liquid loses water, the setting time will be prolonged unduly. If the liquid gains water, the setting time may be decreased to the extent that the restoration will be useless. In such a case, the material shrinks abnormally during setting, and its strength and hardness are reduced.

It has been estimated by Paffenbarger and co-workers[1] that a bottle of liquid may be open a total of 30 minutes during repeated withdrawals of liquid for the individual mixes with a single bottle of powder, even though it is assumed that the stopper is replaced immediately after each withdrawal.

Probably the best solution to the problem is to discard a bottle of liquid when it is two thirds to three quarters used. If the liquid becomes cloudy at any time, it should be discarded immediately. The cloudiness indicates the precipitation of some of the buffers.

The bottle of powder also should be kept tightly closed at all times, to prevent contamination. For example, it is estimated that one part of soot in 100,000 parts of cement powder will make a color change in the cement mix which can be detected by the unaided eye.[9]

DIRECT FILLING RESINS

Certainly the chemical and physical reactions involved in the polymerization of the direct filling resins are not as complicated as are those of the silicate cements. Consequently, there are not as many variables to control during the clinical use of these materials. Such a statement does not imply that a careless technic can be tolerated. To obtain the best results, the dentist should consider all of the theoretical factors involved, and a meticulous attention to details is imperative.

Composition • Although in the future the epoxy resins may offer certain advantages for use as tooth restorative resins,[10] the present discussion will be limited to the acrylic resins commercially available on the American market.

The materials are supplied as a powder and liquid. The powder consists chiefly of polymethyl methacrylate to which is added an initiator, usually benzoyl peroxide (0.5 to 2.0 per cent). The size and shape of the polymer particles vary with different commercial products. As a general rule they are spherical in shape, but in size they may be from 0.2 mm. to a few microns in diameter. In some products ground particles of irregular shape are used.

The pigment is usually ball-milled into the particles, and the delicate shades necessary for the matching of the tooth structure are the result of a careful blending of various brilliant colors as originally formulated with the clear polymer.

A resin plasticizer is also included in the polymer as a rule.

Another additive included in most modern resins is a stabilizer which minimizes color change after polymerization.

The liquid is essentially methyl methacrylate to which an inhibitor (that is, hydroquinone) is added in minute amount (0.006 per cent) in order to aid in the prevention of a spontaneous polymerization of the liquid. Some type of a tertiary amine is also added to the monomer, which acts as an activator for the polymerization reaction. An example of such an amine is dimethyl-p-toluidine, although in at least one product p-toluene sulfinic acid is employed.

Some manufacturers also incorporate a cross-linking agent in the monomer, such as glycol dimethacrylate. Such an additive is supposed to increase the resistance

9. Paffenbarger, G. C. Silicate cements. North-West Den. 27:29 Jan. 1948.

10. Bowen, R. L. Use of epoxy resins in restorative materials. J.D. Res. 35:360 June 1956.

of the polymerized resin to organic solvents.

Polymerization Reactions • When the monomer and polymer are mixed together, an initial reaction occurs between the activator (dimethyl-p-toluidine) and the initiator (benzoyl peroxide). A "free radical" is formed which immediately reacts with the monomer to form the polymer. The reaction can be pictured as monomer molecules being linked to form a chain, or, in other words, the greater the molecular weight of the polymer, the stronger and harder the resulting resin will be. It follows, therefore, that any procedure in manufacture or in manipulation by the dentist, which will increase the molecular weight of the resin, will provide a more satisfactory restoration.

An additional factor which affects the physical properties of the resin is the amount of residual monomer remaining after the polymerization. The greater the amount of monomer remaining, the softer and weaker the restoration will be.[11] The completeness of the polymerization is dependent on the temperature, the ratio of the activator to the initiator, the size and shape of the polymer particles and other technical factors.

A shrinkage of the mass occurs during the polymerization which varies in magnitude from 5 to 9 per cent by volume,[12] according to the commercial product employed. From a clinical standpoint, it makes little difference whether the resin shrinks 5 or 9 per cent, since any such magnitude of shrinkage is too great for the purpose of filling a prepared cavity unless the filling material is compensated. Consequently, such figures are of academic importance rather than practical value, and there is no choice to be made between the products available in this respect.

Manipulation • Although a technic employing a matrix or strip, similar to that described for the insertion of silicate cement can be used, the most successful method is that described by Nealon,[13] generally known as the Nealon or brush technic.

Monomer is placed in three glass dappen dishes. Sufficient polymer is placed in an additional dappen dish. If more than one shade of polymer is required, more dappen dishes are used. A fine sable-hair brush (00) is also required.

The prepared cavity is kept dry throughout the operation, since the presence of moisture accelerates the polymerization and lightens the shade.

The brush is used to saturate the entire prepared cavity with monomer. The tip of the brush is again dipped into the monomer, and then touched to the polymer. A small bead of polymer adheres to the brush and is placed in the floor of the prepared cavity. More monomer is then added with the brush from the second dappen dish containing monomer. This additional monomer causes the polymer bead to flow over the floor of the cavity.

The brush is then freed of adhering polymer particles by rinsing it in the monomer in the third dappen dish. It is blotted free of excess monomer and the tip is again touched to the monomer in the first dappen dish. A bead of polymer is picked up as before and again applied to the cavity. The process is repeated time after time until the prepared cavity is overfull. A piece of tin foil is then burnished over the resin and is allowed to remain until the polymerization process is complete.

11. Caul, H. J.; Sweeney, W. T., and Paffenbarger, G. C. Relationship between residual monomer and some properties of self-curing resins. J.A.D.A. 53:60 July 1956.

12. Smith, D. L., and Schoonover, I. C. Direct filling resins: dimensional changes resulting from polymerization shrinkage and water sorption. J.A.D.A. 46:540 May 1953.

13. Nealon, F. H. Acrylic restorations: operative non-pressure procedure. New York J. Den. 22:201 May 1952.

If at any time during the process, the surface of the resin appears dull, more monomer should be added immediately. The surface should be kept glossy at all times. The final surface is covered with tin foil to prevent the evaporation of monomer.

Three dappen dishes with monomer are employed to prevent any premature mixture of monomer and polymer. If any polymer particles clinging to the brush are introduced into the monomer used in the filling, the initiator and activator will react, and the monomer will be partially depleted of the dimethyl-p-toluidine. The reaction in the tooth will thus be weakened. Also, if the brush is too saturated with monomer before it is dipped in the polymer, some of the monomer will run off into the polymer, and the latter will be partially depleted of activator.

The theory of the Nealon technic is that the polymerization shrinkage will be effectively reduced so far as the clinical manifestations are concerned. If the restoration had been placed in one piece as is done when the pressure technic is used, the shrinkage would be directed toward a common center, and some portions of the restoration would be drawn away from the cavity walls. With the Nealon technic, if it is assumed that each piece shrinks against the piece of resin already added, the effective shrinkage can be reduced.

It should be noted that it is assumed that each piece polymerizes as it is added. Such an assumption implies that the operation is performed slowly and deliberately. Probably the actual time required would be too long for practical consideration for complete polymerization to occur, but if only a partial polymerization takes place, it could be reasoned that utilization of the technic has merit.

Although it is better to postpone the final polishing, the restoration can be contoured and polished at the same sitting.

COMPARISON OF SILICATE CEMENT WITH ACRYLIC RESIN

Hardness • The surface hardness and strength of both the silicate cement and acrylic resin are less than that of any other tooth restorative material. The Knoop hardness number of the silicate cement is in the neighborhood of 70, whereas that for acrylic resin is 16. Neither material should be employed in areas of stress, particularly the acrylic resin, nor should either material be depended on to maintain contact points.

Dimensional Stability and Leakage • Both silicate cement and acrylic resin shrink during setting, but the polymerization shrinkage of the acrylic resin is approximately four times that of the silicate cement.

Even though the effective shrinkage of the resin clinically is partially compensated for when the Nealon technic is used, radioautographs have shown that a leakage occurs. Sausen and co-workers[14] have shown that it was less with the Nealon technic than when the pressure technic was employed. They also showed that silicate cement, as well as all filling materials tested showed leakage.

The dimensional stability of the silicate cement restoration is poor when it is alternately dried and moistened; it shrinks during drying. Although it swells again during wetting, its seal is never as good as in the original condition.[9] It is for this reason that the silicate cement restoration should be kept moist throughout its entire life, as previously pointed out.

The acrylic resin restoration swells as it imbibes water in the mouth. Such imbibition does not overcome the shrinkage, however, and because of the release of stresses incurred during insertion and

14. Sausen, R. E.; Armstrong, W. D., and Simon, W. J. Penetration of radiocalcium through acrylic margins. (Abst.) J. D. Res. 31:485 Aug. 1952.

polymerization,[12] warpage may occur.

The principal disadvantage of the acrylic resin restoration is its extreme lack of dimensional stability during temperature changes in the mouth. For every degree change in temperature of a tooth, an acrylic resin restoration will change in dimension more than seven times as much as a tooth. It has been shown that mouth fluids enter the margins of the acrylic resin restoration when it is cooled. This fluid exchange has been called "percolation."[15] That bacteria can enter the margins of an acrylic resin restoration during percolation has been demonstrated by Seltzer.[16] He found bacterial penetration only after a temperature change of the acrylic resin restoration. No solution to this problem is possible at the present time with the products commercially available.

In contrast to the acrylic resin, the coefficient of linear expansion of silicate cement is so close to that of the tooth that any percolation that occurs is negligible and is not permanent. It may well be that this one difference is sufficient to condemn the use of acrylic resin as a substitute for silicate cement.

Discoloration • The shade of the acrylic resin gradually changes with time because of the oxidation of the activator. Some commercial tooth restorative resins are more susceptible to discoloration than are others because of differences in the type of initiator employed and the minimizing effect of the stabilizer incorporated.

Both the silicate cement and acrylic restoration are likely to exhibit a dark line at the margins in time, but the acrylic restoration is apt to be inferior in this respect.

A good silicate cement restoration properly inserted may change in appearance, but it should not become excessively discolored. Discoloration of the silicate cement filling is more apt to be due to faulty manipulation on the part of the dentist than to the material itself. Dent[17] lists 15 causes for discoloration of a silicate cement restoration, all of which could be avoided with proper care.

It has been shown that both silicate cement and acrylic resin may discolor in contact with medicaments. For example, it has been demonstrated that both types of restorations can be stained by topically applied solutions of stannous fluoride.[18]

Permanence • There can be no denying the fact that silicate cement restorations wash out, and thereby lose their esthetic qualities. The acrylic resins are virtually insoluble in the mouth fluids, and in this respect are superior to the silicate cements.

On the other hand, if by permanence is meant the ability of the material to preserve the tooth against caries attack, the comparison may be different. Phillips and Swartz[4] have shown that silicate cements containing a fluoride flux increase the resistance of the tooth enamel to acid attack. Such a finding corroborates the observations of most clinicians that caries is rarely discovered under a silicate cement restoration.

Phillips and Swartz[4] also demonstrated in the same investigation that the same type of protection was provided by a commercially available direct filling resin containing sodium and stannous fluoride. The clinical significance of such a finding is not known at the present time. However, if such an addition to the resin proves of clinical value, the usefulness of acrylic resin in operative procedures would be greatly enhanced.

15. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at margins of dental restorations. J.A.D.A. 44:288 March 1952.

16. Seltzer, S. Penetration of microorganisms between the teeth and direct resin fillings. J.A.D.A. 51:560 Nov. 1955.

17. Dent, B. Silicate cements: causes for failures. J. Missouri D.A. 36:17 Oct. 1956.

18. Hine, J. F.; Swartz, M. L., and Phillips, R. W. Staining of resin and silicate restorations by topically applied solutions of stannous fluoride. J. Periodont. 28:138 April 1957.

Effect on the Pulp • There is no doubt that the acid in silicate cement and, presumably, the free monomer in the resin filling, are both pulp irritants. In the case of the resin materials it is possible that the tertiary amine or the products of its reaction may affect the pulp, although so far as is known this factor has never been investigated.

Of the two materials, silicate cement appears to be the more irritating. Often the pulp response is irreversible after the insertion of a silicate cement restoration, particularly in younger teeth.[19] If the dentinal tubules lead directly to the pulp from the silicate cement restoration, the probability of an irreversible pulp reaction is considerable.

According to Zander,[20] there are three possibilities by which a fatal pulp disturbance can be avoided.

1. The cavity preparation can be modified so that no dentinal tubules lead directly from the silicate cement restoration to the pulp.

2. The operation can be delayed until secondary dentin has been formed.

3. A zinc phosphate cement lining can be employed to protect the pulp. Zander found that cavity varnishes were not entirely effective in this regard.

Most investigators[21, 22] appear to agree that any pulp disturbance occasioned by acrylic resin is reversible even though a cavity liner is not used. The choice of a cavity liner, if used, is largely limited to zinc phosphate cement. Any varnish is likely to impair the restoration since generally it will be attacked by the residual monomer. The use of phenol or any derivative including eugenol is to be avoided at all costs because of its action on the resin.

Ratings • In comparing the silicate cement restoration with a similar restoration of acrylic resin, the following ratings can be given:

1. Although neither material is adequate in strength and hardness for all types of cavities, the silicate cement is definitely stronger and harder than the acrylic resin.

2. Both materials shrink on setting, but the shrinkage of the acrylic resin is four times that of the silicate cement. Even assuming that the resin restoration recovers some of the lost dimension during water sorption, the high differential thermal expansion of the resin in comparison to that of the tooth causes percolation of mouth fluids. The possibility of eliminating this important undesirable feature appears to be remote at the present time.

3. The tendency of the acrylic resin restoration to discolor in the mouth is somewhat greater than is that of the silicate cement restoration.

4. The silicate cement gradually washes out in mouth fluids, whereas the acrylic resins are stable in this regard.

5. The silicate cement restoration generally is effective in preventing the recurrence of caries and the present acrylic resin restoration, generally speaking, is not.

6. The acrylic resin, *per se*, is less damaging to the pulp than is silicate cement.

If all of the aforementioned points are rated equally, the silicate cement restoration is superior to the acrylic resin restoration in four of the six points mentioned. When the factor of percolation in connection with the acrylic resin restoration is considered, it is doubtful that acrylic resin should be employed in operative dentistry as a tooth restorative

19. Zander, H. A. Reaction of dental pulps to silicate cements. J.A.D.A. 33:1233 Oct. 1946.

20. Zander, H. A., and Pejko, Irene. Protection of pulp under silicate cements with cavity varnishes and cement linings. J.A.D.A. 34:811 June 15, 1947.

21. American Dental Association Council on Dental Research and Council on Dental Therapeutics. Status report on reactions of the pulp to self-curing resinous filling materials. J.A.D.A. 42:449 April 1951.

22. Coy, H. D. Evaluation of acrylic resin as a restorative material. J.A.D.A. 48:266 March 1954.

material until this disadvantage is corrected.

SUMMARY AND CONCLUSIONS

The composition, chemical reactions, physical and chemical properties and the proper methods for use of silicate cement and acrylic resin in operative dentistry have been described.

The silicate cements are superior to the acrylic resins with regard to strength, hardness, dimensional stability, discoloration and protection against recurrence of caries. The acrylic resin restorations are superior to the silicate cement fillings with respect to insolubility in the mouth fluids and they are less irritating to the pulp when used without a cavity lining.

There is a possibility that the incorporation of a fluoride in acrylic resin may help prevent recurrence of caries. Clinical evidence of this effect is lacking at the present time.

The caries-inhibiting effect of dibasic sodium phosphate and dibasic calcium phosphate added to wheat flour and bread diets

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An inhibitory effect of certain inorganic phosphates on experimental rat and hamster caries has been observed by other investigators.[1-5] In this paper there are results which support this evidence and extend our own previous studies in this field.[6] The additional data throw light on the possibility of adapting a dietary phosphate supplement to human caries control. Of special interest in this connection are recent human dental caries studies conducted by Strålfors[7] in Sweden which indicated that a dibasic calcium phosphate ($CaHPO_4$) supplement in the bread and sugar of children's school lunches had a caries-preventive effect.

EXPERIMENTAL METHOD

The composition and analyses of these cariogenic diets are shown in Table 1. The dental caries data appear in Table 2. Previous studies demonstrated the development of rat caries on a cereal diet containing heat-processed corn, oats and wheat,[8] as well as on diets containing dry

National Institute of Dental Research, National Institutes of Health, U. S. Public Health Service, Department of Health, Education and Welfare.

1. Mitchell, D. F.; Helman, E. Z., and Chernausek, D. S. Ammoniated dentifrices and hamster caries: further studies on the effects of ingestion. Science 116:537 Nov. 14, 1952.

2. Constant, M. A., and others. Dental caries in the cotton rat. XIV. Further studies of caries production by natural diets with especial reference to the role of minerals, fat, and the stage of refinement of cereals. J. Nutrition 53:17 May 1954.

3. Strålfors, Allan. Karieshämning genom fosfater. Svensk Tandläk. Tskr. 49:108 Feb. 15, 1956.

4. Bernard, Peter, and Johansen, Erling. Effect of 2 per cent $CaHPO_4$ dietary supplement on experimental dental caries in the rat. (Abst.) J. D. Res. 37:34 Feb. 1958.

5. Nizel, A. E., and others. Effect of phosphate supplement to diet on development of hamster caries. (Abst.) J. D. Res. 37:35 Feb. 1958.

6. McClure, F. J. Wheat cereal diets, rat caries, lysine and minerals. J. Nutrition 65:619 Aug. 1958.

7. Strålfors, Allan. Unpublished data.

Table 1 • Composition and analysis of diets (per cent)

Diet no.	186	286	287	288	289	290	291	292	293
Whole wheat flour	80.00	—	—	—	—	—	78.75	77.25	78.38
Bread A*	—	80.00	78.60	78.60	—	—	—	—	—
Bread B*	—	—	—	—	80.00	—	—	—	—
Bread C*	—	—	—	—	—	80.00	—	—	—
Cerelose	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Liver powder	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
$CaCO_3$†	—	—	—	—	—	—	1.25	1.25	0.12
$CaHPO_4$‡	—	—	1.40	—	—	—	—	—	1.50
Na_2HPO_4§	—	—	—	1.40	—	—	—	1.50	—
Analysis of diets (per cent)									
Ash	1.33	2.19	3.24	3.37	3.01	3.17	2.37	3.65	2.87
Calcium	0.03	0.11	0.46	0.11	0.42	0.07	0.52	0.53	0.54
Phosphorus	0.31	0.14	0.36	0.43	0.40	0.38	0.32	0.63	0.64
Protein (N x 6.25)	14.02	12.93	12.93	12.81	13.06	12.62	14.01	14.01	14.02

*Bread A, Sunbeam Bread as prepared by the Schneider Baking Co., Washington, D. C. Bread B was the same as Bread A except that the flour contained 2.0% $CaHPO_4$. Bread C was the same as Bread A, except that the flour contained 2.0% Na_2HPO_4.

In addition to the above diet components the rats received orally a weekly supplement of vitamins A, D and E.

†Fluoride free.

‡The fluoride content of this mineral was 6.4 ppm.

§The fluoride content of several batches of Na_2HPO_4 was 8.3, 7.1, 4.6 and 3.6 ppm. Fluoride added by these minerals was not sufficient to influence the caries results.

Table 2 • Effect of Na_2HPO_4 and $CaHPO_4$ on rat caries

Exp. no.	Diet no.	Mineral regimen	No. of rats	Av. daily gain (Gm.)	Rats with caries (%)	Lower carious teeth (per rat)	Caries severity score (per rat)
Effect of 2.0% Na_2HPO_4 in food or drinking water							
1-a*	186	Control	18	0.92	72.2	1.33 ± 0.27‡	2.17 ± 0.20‡
1-b†			20	0.78	100.0	4.05 ± 0.53	10.60 ± 2.12
2-a	186	Na_2HPO_4 in diet	19	0.93	10.5	0.21 ± 0.14	0.21 ± 0.14
2-b			19	0.82	84.2	1.84 ± 0.26	3.21 ± 0.56
3-a	186	Na_2HPO_4 in drinking water	20	0.74	65.0	1.55 ± 0.33	2.20 ± 0.19
3-b			14	0.80	85.7	2.21 ± 0.14	3.64 ± 0.85
Effect of Na_2HPO_4 vs. $CaHPO_4$ when diet 186 was supplemented with calcium							
4	291	Control—$CaCO_3$	37	1.00	81.0	3.05 ± 0.37	5.57 ± 0.87
5	292	Na_2HPO_4 and $CaCO_3$	39	1.32	5.0	0.05 ± 0.01	0.08 ± 0.02
6	293	$CaHPO_4$ and $CaCO_3$	38	0.67	92.1	3.76 ± 0.33	8.42 ± 1.06
Effect of Na_2HPO_4 and $CaHPO_4$ added to bread diet or flour used to prepare bread							
7	286	Control	34	0.86	79.4	2.88 ± 0.37	7.32 ± 1.45
8	287	$CaHPO_4$ added to diet	34	0.87	63.7	2.05 ± 0.32	4.97 ± 1.11
9	288	Na_2HPO_4 added to diet	34	0.82	50.0	1.23 ± 0.25	2.58 ± 0.80
10	289	$CaHPO_4$ added to flour	34	0.86	50.0	1.65 ± 0.35	4.20 ± 1.00
11	290	Na_2HPO_4 added to flour	34	0.65	55.8	1.97 ± 0.37	4.24 ± 1.10

*Rats from Naval Medical Research Center.

†Rats from National Institutes of Health.

‡Standard error.

bread, wheat flours and a commercial wheat biscuit.[6] In these current studies whole wheat flour, or dry bread, and cerelose were the main ingredients of the diets, and the imposed dietary variables were dibasic sodium phosphate (Na_2HPO_4), dibasic calcium phosphate ($CaHPO_4$) or calcium carbonate ($CaCO_3$). The basal diets are extremely low in calcium and are borderline in the requirement of protein. The basal bread diet is also low in phosphorus. All the diets are deficient in the essential amino acid lysine and are inadequate for normal growth. Although underweight, the rats appeared to be normal otherwise, and thus provided interesting information relative to these phosphate supplements.

In experiments 2-a and 2-b of the first study (Table 2) the diet was supplemented with 2.0 per cent Na_2HPO_4. In experiment 3-a and 3-b the drinking water contained 2.0 per cent Na_2HPO_4. Trios of littermate rats were used, those rats in experiment 1-a and 1-b serving as controls. Rats receiving the water containing 2.0 per cent Na_2HPO_4 rejected this water and drank approximately 5.4 cc. daily as compared with 10.1 to 11.7 cc. daily for the rats receiving distilled water. Daily food intake averaged 7.3 to 7.7 Gm. in all these groups. As shown in Table 2 the rats from the two colonies, the Naval Medical Research Center (N.M.C.) and the National Institutes of Health (N.I.H.) on this diet proved to be strikingly different in susceptibility to caries. Both groups were the Osborne-Mendel strain.

Experiments 4, 5 and 6 were planned to compare the effects of Na_2HPO_4 and $CaHPO_4$ when the calcium in diets 291, 292 and 293 was adequate, that is, 0.52, 0.53 and 0.54 per cent respectively.

The bread diets 286-290 (Table 1) were prepared by drying sliced bread in air and then grinding to a flour before mixing it with the other ingredients of the diet. As noted in the footnotes of Table 1, prior to baking the bread for diets 289 and 290 the flour was mixed with 2 per cent Na_2HPO_4 or 2 per cent $CaHPO_4$. The same phosphates were mixed directly into the dry bread diets 287 and 288 in amounts equivalent to what was provided by the breads baked with the phosphated flours. Diet 286 was without mineral supplement and served as the control.

In all these experiments (Table 2) the rats received food and water *ad libitum*. Likewise all the rats were either the Sprague-Dawley, Holtzman or Osborne-Mendel strain. At the start of the experiments they were at weanling age and weighed 30 to 35 Gm. Housed two per cage, they were continued on the experiment 60 days. Comparisons of control and mineralized diets were all based on littermate rats.

At sacrifice the heads were autoclaved to aid in the removal of soft tissues, and the mandibles and maxillae placed under water in the cold prior to the caries diagnosis. Examination of the teeth was made under low power magnification (X7) immediately after removing the maxillae and mandibles from the cold water and while the teeth dried slowly in the heat of the microscope lamp. The initial white opaque lesions are easily detected during this slow drying. The lesions associated with these diets, as in previous studies,[6,8] were found most frequently on lower buccal surfaces. Severe occlusal caries, the type most prevalent in rats given coarse corn or rice or sugar diets, occurred only to a limited extent. All the lesions observed on all the lower molars were recorded.

Severity of caries was evaluated as follows: Lingual, buccal and occlusal tooth surfaces are each divided into three areas on the first molar and two areas on the second and third molars. For completeness of this diagnosis of teeth *in situ*, a

8. McClure, F. J. Dental caries in rats fed a diet containing processed cereal foods and a low content of refined sugar. Science 116:229 Aug. 29, 1952.

half of the mesial surface of the first molar and half the distal surface of the third molar were included in the lingual and buccal areas of these two teeth. Each carious lesion was evaluated as to whether it involved one, two or three areas of a particular surface and the lesion in each area was given a relative severity score of 1, 2 or 3. A maximum diagnosis of caries in the first molar for example is nine areas involved and a total score of 27. The final caries data as presented in Table 2 include the percentage of rats having caries, the average number of lower carious teeth per rat and the severity score per rat—determined by dividing the total group score by the number of rats in the group.

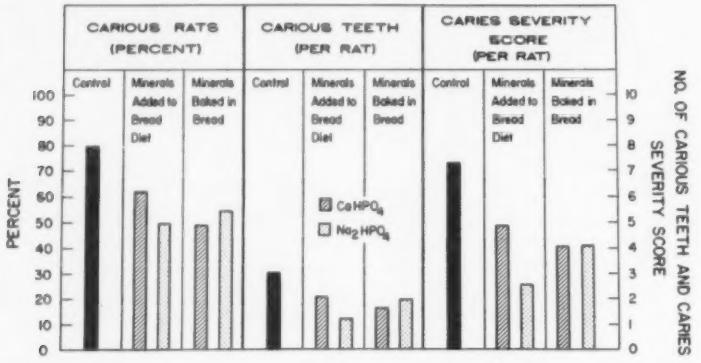
RESULTS

Caries results shown in Table 2 (experiments 1-a, 1-b, 2-a, 2-b, 3-a and 3-b) and obtained with both N.M.C. and N.I.H. strains of rats demonstrate a pronounced inhibitory effect of dietary Na_2HPO_4 on both the severity of caries and on the number of carious teeth per rat. The incidence of caries also was reduced from 72.2 per cent in the controls to 10.0 per cent in the experimental animals of the N.M.C. strain and from 100.0 per cent in the controls to 84.2 per cent in the experimental animals of the N.I.H. strain.

Water-borne Na_2HPO_4 apparently was not effective in preventing the relatively mild caries which developed in the N.M.C. strain. However in the N.I.H. strain which proved to be very caries susceptible on this diet, the use of drinking water containing Na_2HPO_4 caused a difference in the number of carious teeth between the control group (an average of 4.05 ± 0.53, experiment 1) and the experimental group (2.21 ± 0.14, experiment 3) and similarly caused a striking difference in the caries severity scores, that is, 10.60 ± 2.2 (experiment 1) and 3.64 ± 0.83 (experiment 3). The use of water-borne Na_2HPO_4 caused a difference in caries incidence in the N.I.H. strain of rats between the control group (100.0 per cent, experiment 1) and the experimental group (85.7 per cent, experiment 3).

Experiments 4, 5 and 6 brought out a striking difference in the effects of Na_2HPO_4 and $CaHPO_4$ when added to diet 186, which was also supplemented with $CaCO_3$. The $CaHPO_4$ supplement had no anticaries effect (experiment 6). In fact it will be noted that the severity score-average for rats receiving $CaHPO_4$ was 8.42 ± 1.06 as compared with an average score of 5.57 ± 1.45 for the control group of rats. Previously $CaHPO_4$ as well as $CaCO_3$ had failed to prevent the caries produced by diet 186.[6] Very striking differences in caries incidence, number of carious teeth, and severity scores resulted between the control rats and those receiving the Na_2HPO_4 supplement (experiment 5). There were only two rats with carious teeth in this latter group of 39 rats, each of which had but one carious tooth. This pronounced effect of Na_2HPO_4 agrees with the results of a previous study using diet 186 without a $CaCO_3$ supplement.[6]

The data in Table 2 indicate that when present in these bread diets, Na_2HPO_4 as well as $CaHPO_4$ had a caries-inhibiting effect. The percentage of carious rats was reduced from 79.4 per cent (control) to 63.7, 50.0, 50.0 and 55.8 per cent in rats receiving the phosphate supplements (Table 2). Using Fisher's "t" test of significance of paired differences, a statistical analysis of the data on the number of carious teeth (diets 287, 288, 289 and 290 versus diet 286) resulted in the following P values of significance, respectively: <0.30, <0.01, <0.05, <0.10. When the same analysis was applied to the severity scores, phosphated diets 287, 288, 289 and 290 in comparison with diet 286 gave the following P values: <0.10, <0.01, <0.10 and <0.10. Although of all the phos-



Effect of phosphate supplements on dental caries produced by bread-cerelose diets

phated diets only diet 288 (containing Na_2HPO_4) showed a high level of statistical significance, all the phosphated diets lowered the caries experience. Less caries was associated with the use of phosphated flour diets (289 and 290) as well as with the use of phosphates added directly to the diets (287, 288). The results with the bread diets are shown graphically in the illustration.

DISCUSSION

The results of these studies add to our previous evidence of the significant role of Na_2HPO_4 as an anticaries agent.[6] In one experiment Na_2HPO_4 was cariostatic when present in the drinking water as well as in the diet. Likewise when added to a bread diet Na_2HPO_4 was significantly caries inhibitory. It also was caries preventive when present at a level of 2.0 per cent in the flour used to prepare bread, the main ingredient of a cariogenic diet.

In a previous study it was found that $CaHPO_4$ was not cariostatic when added to a diet of whole wheat flour. Similarly $CaHPO_4$ in this current study did not prevent the caries developed by a whole wheat flour diet which was also made adequate in calcium. It is of particular interest that $CaHPO_4$ did have a caries-preventive effect when added to the bread diet directly and when added to the flour used to prepare the bread for the diet. A possible explanation for the positive effect of $CaHPO_4$ in the bread diets is the fact that salt in the bread may have solubilized the $CaHPO_4$ or become otherwise involved in the cariostatic action. In the wheat flour diet of this study as well as in a previous study,[6] no salt was present and no anticaries effect of $CaHPO_4$ was observed. Support for this proposed explanation may be found also in data reported recently by Barnard and Johansen,[4] that is, a caries-inhibitory effect of $CaHPO_4$ was observed in two diets containing NaCl but not in a diet which contained no NaCl. These data in addition to our previous evidence that the soluble Na_2HPO_4 was cariostatic whereas insoluble $CaHPO_4$ was not,[6] as well as the suggestion that the presence of salt in the diet is a factor, may point to the cariostatic effect of these minerals being localized within the oral cavity. Maturation and mineralization of enamel conceivably could be influenced by enamel surface contact with these minerals. Dibasic sodium phosphate, it may be recalled, is also a very effective buffering agent. These hypotheses need

confirmation. Other investigators, however, have suggested that the caries-inhibitory action of mineral supplements possibly is localized within the oral cavity.[5]

The several previous experimental animal studies [1-6] in addition to the results presented in this report have unquestioned interest as indicative of a possible means of dietary control of human dental caries. In this regard the human data recently obtained in Sweden by Strålfors[7] as previously mentioned are particularly valuable and suggestive of a practical adaptation of phosphates to human caries control. In the light of all the accumulated data, further studies of the effect of dietary phosphate minerals on human dental caries are indicated. Our own experimental studies thus far have consistently emphasized a remarkably pronounced effect of Na_2HPO_4. Whereas a dietary supplement of $CaHPO_4$ may also be effective, this has depended on a soluble salt such as NaCl in the diet, or perhaps other diet factors.

It may be noted that phosphates are not an unusual additive to flour. Self-rising flour, widely used particularly in the southern United States, contains a phosphate mineral. The self-rising flour of a Washington, D. C. milling company for example contains $NaHCO_3$ 1.375 per cent, $Ca(H_2PO_4)_2$ 1.75 per cent, and NaCl 2.25 per cent. This flour and other phosphates are currently being investigated in experimental caries studies at the National Institute of Dental Research.

SUMMARY

The presence of 2.0 per cent Na_2HPO_4 in the diet had a significantly preventive effect on smooth surface dental caries in white rats. In one experiment, 2.0 per cent Na_2HPO_4 in drinking water also was cariostatic. A supplement of $CaCO_3$ plus Na_2HPO_4 in the same cariogenic diet also had a preventive effect on smooth surface caries in white rats. $CaHPO_4$, however, when added to this particular diet had no caries-preventive effect.

The addition of 2.0 per cent $CaHPO_4$ or 2 per cent Na_2HPO_4 to flour used to prepare bread which was the chief constituent of a cariogenic rat diet reduced the caries incidence and to some extent the severity of caries in white rats. These same phosphates added directly to a diet containing bread (made without phosphate additions to the flour) likewise were cariostatic. Na_2HPO_4 was most cariostatic when added directly to the diet.

The data suggest that the cariostatic effect of the $CaHPO_4$ probably is influenced by some other mineral, perhaps NaCl or other factors in the diet.

Body and Mind • Man is to himself the most wonderful object in nature; for he cannot conceive what the body is, still less what the mind is, and least of all how the body should be united to the mind. *Blaise Pascal, The Man and the Message.*

Caries-inhibiting value of a dentifrice containing stannous fluoride: final report of a two year study

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Stannous fluoride has shown considerable promise as an anticariogenic agent. It has been shown to be more effective than sodium fluoride for reducing enamel solubility *in vitro*,[1-3] for reducing dental caries in rats[4-6] and hamsters,[7] and for reducing dental caries in children after topical treatment.[8-10] Stannous fluoride combined with a compatible abrasive (calcium pyrophosphate) in a dentifrice has also shown effectiveness in decreasing dental caries in children and adults.[11-15] The first year's report[16] of this study at Bloomington, Minn., showed an encouraging 35 per cent reduction in the incidence of carious teeth with supervised brushing. This report concludes the two year study.

PROCEDURE

Included in the study were 609 children who were in the third and fourth grades at the time of initial examination in May, 1955, and whose parents signed authorizations for participation. These children all received three annual dental examinations by a single examiner with the aid of a portable dental chair, explorer, and a Burton diagnostic mouth light. Two posterior bitewing and two anterior roentgenograms were taken at each examination. Any carious surfaces which were subsequently found by the roentgenographic examination were added to the examination charts.

The dentifrice was supplied to the children in plain tubes, with only the

*Chief, section of dental health, Minnesota Department of Health.

†Assistant chief, section of dental health, Minnesota Department of Health.

1. Van Huysen, G., and Muhler, J. C. Enamel solubility reducing effect of flavored low concentration stannous fluoride solution. J.D. Res. 27:46 Feb. 1948.

2. Muhler, J. C., and Day, H. G. Relation of pH to the effectiveness of sodium fluoride and stannous fluoride in decreasing enamel solubility. J.D. Res. 31:102 Feb. 1952.

3. Walsh, R. H., and others. Effects of buffered solutions of sodium fluoride and stannous fluoride on the solubility of powdered enamel using repeated decalcification. J.D. Res. 36:118 Feb. 1957.

4. Muhler, J. C., and Day, H. G. Effects of stannous fluoride, stannous chloride and sodium fluoride on the incidence of dental lesions in rats fed a caries-producing diet. J.A.D.A. 41:528 Nov. 1950.

5. Muhler, J. C., and Day, H. G. Effect of stannous fluoride in food and in drinking water on caries prevention in rats on high sucrose and coarse corn diets. J. Nutrition 44:413 July 1951.

6. Muhler, J. C.; Nebergall, W. H., and Day, H. G. Preparations of stannous fluoride compared with sodium fluoride for the prevention of dental caries in the rat. J.A.D.A. 46:290 March 1953.

7. Radike, A. W., and Muhler, J. C. Incidence of dental caries in hamsters receiving two different water-soluble fluorides at low concentrations. J.D. Res. 32:807 Dec. 1953.

8. Howell, C. L., and others. Effect of topically applied stannous fluoride on dental caries experience in children. J.A.D.A. 50:14 Jan. 1955.

9. Slack, G. L. Effect of topical application of stannous fluoride on the incidence of dental caries in 6-year-old children. Brit. D.J. 101:7 July 3, 1956.

10. McLaren, H. R., and Brown, H. K. A study of the use of a topically applied stannous fluoride solution in the prevention of dental caries. Canadian J. Pub. Health 46:387 Oct. 1955.

11. Muhler, J. C., and others. The effect of a stannous fluoride-containing dentifrice on caries reduction in children. J.D. Res. 33:606 Oct. 1954.

12. Muhler, J. C., and others. Effect of a stannous fluoride-containing dentifrice on caries reduction in children. II. Caries experience after one year. J.A.D.A. 50:163 Feb. 1955.

letter "E" or "H" appearing on the carton. The two dentifrices appeared to be identical in taste, consistency and appearance. Formulation information was published in the first year report.[16]

The study was divided into two parts:

Part One • The children at one school received the stannous fluoride dentifrice and at the second school, the control. These schools were similar in size. In both schools, the study children brushed their teeth under supervision once a day, after lunch. They were encouraged to brush their teeth at home after each meal and during vacations.

Part Two • In the hope of determining the effect of brushing the teeth in school at noon in contrast to unsupervised brushing, the children at two small schools were paired according to age and caries experience and then divided into two groups with "E" and "H" dentifrices. These children did not brush their teeth in school but were given dentifrices and brushes for home usage. They were also encouraged to brush their teeth at home after each meal and during vacations.

The similarity of the study and control groups at the beginning of the program was studied and the two groups were found to be closely alike in age, sex, and DMF teeth and surfaces.[16] An interim study determined that like amounts of dentifrice were being used at home by the several groups of the study.

Another side study reported in the first year concerned the level of fluoride in the urine of boys in the study and control groups. Boys in both groups had a fluoride concentration in their urine of about 0.2 ppm. That would seem to indicate that no significant amount of the dentifrice was being swallowed. Water samples from Bloomington wells averaged 0.1 ppm of fluoride.

The relative effectiveness of the "E" and the "H" dentifrices and, consequently, of the dentifrice containing 0.4 per cent stannous fluoride, was measured by the comparative incidence of new carious teeth and surfaces in the study and control children during the two years of the study.

RESULTS AND DISCUSSION

Part One • Table 1 shows the DMF teeth and surfaces incidence in the study

13. Muhler, J. C., and others. The effect of a stannous fluoride-containing dentifrice on dental caries in adults. J.D. Res. 35:49 Feb. 1956.

14. Muhler, J. C., and others. A comparison between the anticariogenic effects of dentifrices containing stannous fluoride and sodium fluoride. J.A.D.A. 51:556 Nov. 1955.

15. Muhler, J. C. Effect on dental caries of a dentifrice containing stannous fluoride and dicalcium phosphate. J.D. Res. 36:399 June 1957.

16. Jordan, W. A., and Peterson, J. K. Caries inhibiting value of a dentifrice containing stannous fluoride: first year report of a supervised toothbrushing study. J.A.D.A. 54:589 May 1957.

Table 1 • Mean DMF incidence, May 1955-May 1957, groups brushing in school

Group	No. of children	DMF teeth incidence		DMF surfaces incidence				
				Mean				Standard error
		Mean	Standard error	Proximal	Occlusal	Buccolingual	Total	
Study (Sn F)	190	1.81	0.136	2.08	.81	.68	3.57	0.238
Control	215	2.15	0.135	2.65	.95	.89	4.49	0.246
Per cent reduction			15.8	21.5	14.7	23.6	20.5	
Probability			0.08				0.01	

Table 2 • Mean DMF incidence, May 1955-May 1957; unsupervised usage

Group	No. of children	DMF teeth incidence		DMF surfaces* incidence	
		Mean	Standard error	Mean	Standard error
Study (SnF_2)	104	1.75	0.161	3.88	0.282
Control	100	2.08	0.235	4.43	0.372
Per cent reduction			15.9		12.4
Probability			0.2		0.2

groups and the control groups that brushed their teeth in school. Sixteen per cent fewer DMF teeth and 21 per cent fewer DMF surfaces developed in the group using the stannous fluoride dentifrice than developed in the control group during the two years of the study.

There was a greater reduction (24 per cent) in DMF buccolingual surfaces than in proximal (21 per cent) and in occlusal (15 per cent) surfaces. Thirty per cent of the children in the group using the stannous fluoride dentifrice, in contrast to 25 per cent of the children in the control group, did not develop new DMF teeth in the two years. The same pattern occurred in the incidence of DMF surfaces, where the ratio was 13 per cent to 8 per cent, respectively.

Part Two • Table 2 shows the DMF teeth and DMF surfaces incidence in the study and control groups that were divided equally in the same schools. These children did not brush their teeth in school but were given dentifrice and brushes for home usage. Sixteen per cent fewer DMF teeth and 12 per cent fewer DMF surfaces developed in the group using the stannous fluoride dentifrice for two years than developed in the control group. These differences are not statistically significant. Also, no conclusion is warranted from the data concerning the influence of brushing in school in addition to unsupervised home brushing.

SUMMARY

The effectiveness of a stannous fluoride dentifrice was tested in 609 Bloomington, Minn., children over a two year span. There were 16 per cent fewer DMF teeth and 21 per cent fewer DMF surfaces in the group brushing at school with the test dentifrice than in a control group brushing under similar conditions. A third of the children in a second study did not brush in school. The data from this group also indicate less caries incidence with the test dentifrice, but do not permit any conclusion to be drawn concerning the influence of brushing in school.

The results of the first year of observation of the supervised brushing group have been published.[16] At the end of one year, the reduction in carious surface incidence was 34 per cent. This was more encouraging than the 21 per cent reduction at the end of two years. However, the reduction in numbers of new DMF surfaces, which was 0.77 at the end of one year, increased to 0.92 at the end of two years.

Energy of the Atom • The new types of energy released by the atom and controlled by the electron have already proved to be highly effective. The features of vital technical growths can be discerned in numberless embryos in the womb of science. *David Sarnoff, speech, Drexel Institute of Technology.*

Preliminary investigation of some basic problems of instrument sterilization

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Since there is an increased incidence of serum hepatitis and a possibility of this infection's being spread through dental procedures,[1-5] a re-evaluation of disinfection and sterilization methods for dental instruments, with special emphasis on the contra-angles and handpieces, is important at this time. Although sterilization can be accomplished effectively, the corrosion of instruments and lack of lubrication for some types of equipment are complicating factors. This current study was undertaken jointly, therefore, by the dental materials and bacteriology departments of the University of Michigan School of Dentistry in an attempt to determine a practical method of sterilization which would be effective, yet prevent corrosion and not interfere with proper lubrication where necessary.

An evaluation of lubricants for dental handpieces has been reported previously,[6] since it was believed that the choice of a desirable lubricant might influence the manner of sterilization. The second phase of the study was concerned with the types of microorganisms found in the internal parts of handpieces and contra-angles after use.[7] Eight areas of approximately 100 handpieces and contra-angles were examined bacteriologically. It was found that the bur tube of the contra-angle was contaminated by salivary organisms in about 25 per cent of those checked, whereas the first gear of the contra-angle was contaminated in 8 per cent of those checked. Other areas of the handpieces tested were relatively free of salivary contamination. These observations would seem to indicate that disinfection or sterilization of at least some internal parts of the handpiece is necessary.

Sterilization, the killing of all forms of life found on instruments, can be accomplished effectively by means of steam under pressure, that is, autoclaving, at a temperature of 250° F. for ten minutes.

This report represents the partial results of studies supported by Contract No. D-185 between the U. S. Public Health Service and the University of Michigan.

Physical Research Laboratory, University of Michigan School of Dentistry.

1. Capps, R. B. Viral hepatitis. In Principles of internal medicine, ed. 2, Harrison, T. R., and others, editors. New York, Blakiston Co., 1954, p. 1115, 1119.

2. Droller, Hugo. Outbreak of hepatitis in a diabetic clinic. Brit. M. J. 1:623 May 5, 1945.

3. Expert Committee on Hepatitis, World Health Organization Technical Report Series, No. 62. New York, International Documents Service, Columbia University Press, March 1953.

4. Foley, F. E., and Gutheim, R. N. Serum hepatitis following dental procedures: a presentation of 15 cases including three fatalities. Ann. Int. Med. 45:369 Sept. 1956.

5. Havens, W. P., Jr. Period of infectivity of patients with homologous serum jaundice and routes of infection in this disease. J. Exper. Med. 83:441 June 1946.

6. Charbeneau, G. T., and Peyton, F. A. Evaluation of lubricants for dental hand-pieces and contra-angles. J. D. Res. 36:479 June 1957.

However, this method corrodes some types of instruments and is especially destructive to most geared and hinged instruments. Dry-heat sterilization can be accomplished by the use of an oven heated to a temperature of 320° F. for one to one and a half hours. These are the minimal temperature and time that will accomplish sterilization. Although this method does not corrode instruments, it is not commonly used because of the long time involved.

Disinfection methods do not kill all forms of life. By definition, these methods are supposed to render noninfectious all microorganisms except the spore stage of microorganisms. The spore stage, when present, is more resistant to physical and chemical agents than is the vegetative stage of microorganisms. Since spores are more resistant, one of the criteria for the effectiveness of a sterilizing agent is whether or not spores are killed. However, not all spores are equally resistant, so that spores used in testing must be those which are known to be resistant to physical or chemical agents or both.

Boiling water is an effective disinfecting method when instruments are immersed in water at 212° F. for ten minutes. This method will not destroy spores, but will kill tubercle bacilli and viruses. Again, however, instruments are corroded by boiling water.

The use of silicone oils at temperatures of 300° F. for ten minutes accomplishes disinfection; however, the residual oil on the bearings and gears of rotating instruments functions as a poor lubricant, probably because of its high viscosity.[6]

Chemical disinfection has been used widely in dentistry, since it is not as likely to cause corrosion when used with antirusting additives. Its effect on microorganisms is questionable, because in many instances the effect is bacteriostatic rather than bactericidal. Chemical disinfectants suitable for use on metallic instruments cannot be relied on to kill tubercle bacilli, and the World Health Report on Hepatitis[3] indicates that many chemical solutions have been proved to have no significant effect on the virus of hepatitis. The report states that "no chemical disinfectants are accepted for sterilization of instruments."

The incidence of serum hepatitis has increased considerably since the development of widespread use of parenteral forms of therapy and have become a problem of public health significance. For these reasons, it was thought necessary to re-evaluate our disinfecting procedures and find a sterilizing method which would not ruin instruments.

In the past five years manufacturers have developed and marketed relatively inexpensive autoclaves which reach the proper sterilizing temperatures quickly and are controlled automatically. This has removed the previous objections to the high cost of the autoclave and the length of time necessary to reach sterilizing ranges. Although autoclaving can result in sterilization of instruments with minimal time and effort expended, the heat and moisture result in the corrosion of some dental instruments. It has been claimed, however, that an oil-in-water emulsion type preparation used to precoat instruments has the qualities of preventing corrosion and providing some lubrication of instruments so that they may be autoclaved without harm.[8]

The purpose of this bacteriologic study was to determine if the layer of oil on the instrument, after coating with an emulsion, allows penetration of steam.

MATERIALS AND METHODS

Three emulsions were used in our experiments:

1. I.S.L. emulsion (instrument-sterilization-lubrication) distributed by the

7. Crowley, Mary C., and Charbeneau, G. T. Bacteriological study of salivary contamination of the dental contra-angle and handpiece. J.A.D.A. 55:775 Dec. 1957.

8. American Sterilizer Company. Patent No. 2,628,887.

Table 1 • Bacteriologic results of the effect of I.S.I. emulsion plus autoclaving on dental burs* (121° C., 15 min.)

Preparation of burs for testing	No. of burs tested	Results		Controls		
		Pos.	Neg.	A†	B‡	C§
24 hour culture						
No heat treatment	51 (3)‖	0	51	+	+	−
5 day old culture heated at 58° C., 10 min.	18 (1)	0	18	+	+	−
6 day old culture heated at 58° C., 10 min. + saliva	21 (2)	0	21	+	+	−
6 day culture (58° C., 10 min.) + saliva + defibrinated blood, dried in incubator 24 hours	41 (2)	0	41	+	+	−
6 day culture (58° C., 10 min.) + saliva + fresh whole blood, dried in incubator 24 hours	16 (3)	0	16	+	+	−
Total	147 (11)	0	147 (100%)			

*B Subtilis morphotype globigii used to inoculate all instruments.

†Control A—inoculated burs, to check inoculation of burs.

‡Control B—inoculated burs plus emulsion, to check possible inhibitory effect of emulsion alone.

§Control C—inoculated burs autoclaved at same time as test burs, to check operating efficiency of autoclave.

‖Figure in parenthesis refers to number of autoclave runs.

American Sterilizer Company. This emulsion apparently is a mixture of oil, water and an emulsifying agent.

2. AC-10, first suggested by Harvey and co-workers[9] for use in boiling instruments, was made up according to the manufacturer's instructions and used as a precoating prior to autoclaving. This mixture contains water, oil and sodium carbonate.

3. Emulsion A was one that was made up in our laboratories. It consisted of:

5 per cent Finoil, a light mineral oil obtained from Standard Oil Company.

1.25 per cent Span 80 (sorbitan mono-oleate).

1.25 per cent Tween 80 (polyoxyethylene [20] sorbitan mono-oleate) and water.

Cutting and jointed instruments were chosen as test instruments. The instruments were first cleaned in Stoddard Solvent, dried, and then immersed in a culture of *Bacillus subtilis*, morphotype *globigii* (*B. globigii*). This organism was chosen because it produces an orange pigment which makes its identification and differentiation from other spore-forming organisms less difficult.

Some tests were made with young 24 hour old unheated cultures, since spores may be more resistant to heat at this stage of their development. Tests were also made with five-day and six-day-old cultures, heat-treated at 58° C. for ten minutes. This was done to ensure a better production of spores which are present in older cultures, and to kill off the vegetative stage of the organism which is not resistant to heat. Spore counts were done on the heat-treated culture to determine that an adequate number of spores were present. A microscopic examination of the 24 hour old culture was made to ascertain that spores were present. After the instruments had been inoculated with the spore-forming organism, they were placed in the emulsion. The excess of emulsion was drained off, and the instruments

9. Harvey, W.; LeMay, C. H., and Shuttleworth, C. W. Sterilization of dental handpieces. Proc. Roy. Soc. Med. 40:507 July 1947.

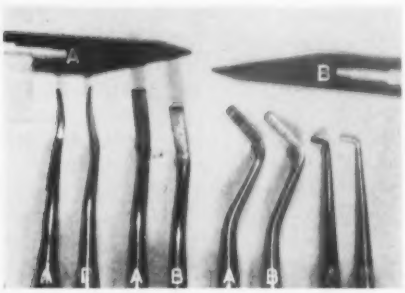
were placed in the autoclave and exposed to steam at a temperature of 121° C. for 15 minutes.

Immediately after removal of the instruments from the autoclave, cultures were obtained by means of sterile cotton swabs which were implanted in nutrient broth. Cultures were checked for growth daily, but all negative cultures were incubated for ten days at a temperature of 37° C. They were then plated on nutrient agar as a further check on growth.

The anticorrosive effect of this method was determined on paired instruments, one of which was coated with emulsion before autoclaving. The paired instruments were autoclaved simultaneously a number of times.

Some preliminary tests were made with large instruments (forceps, chisels, scissors, bar benders and hemostats) which were contaminated with *B. globigii,* treated with emulsion and autoclaved. Cultures obtained from these instruments were all negative after autoclaving.

It was decided to test dental burs because they are small, not easily mechanically cleansed, and may be tested under conditions of use. The burs were inoculated with (1) 24 hour old culture of *B. globigii;* (2) 5 to 6-day-old heat-treated cultures of *B. globigii;* (3) old heat-treated cultures of *B. globigii,* plus saliva to ascertain if saliva interfered with the penetration of steam through the emulsion; (4) old heat-treated cultures of *B. globigii,* plus saliva, plus defibrinated blood, all dried in the incubator 24 hours; (5) old heat-treated cultures of *B. globigii,* plus saliva, plus fresh whole blood, all dried in the incubator 24 hours. After inoculation the burs were coated with the emulsion and autoclaved. Controls were used to check the inoculation of the burs, the possible inhibitory effect of the emulsion alone, and the operating efficiency of the autoclave. All burs, after treatment, whether under test conditions or as controls, were placed individually in tubes of nutrient broth. The broth was incubated at 37° C. for ten days and plated on nutrient agar if no evidence of growth was observed before this time. The results are shown in Table 1.



Instruments after repeated autoclaving. A, unprotected instruments. B, emulsion-coated instruments

It is apparent that the emulsion did not interfere with penetration of steam and that the instruments were sterilized. The illustration shows the effect of repeated autoclaving on unprotected and emulsion-coated instruments. The emulsion has protected the instruments from corrosion.

The effect of AC-10 and the experimental emulsion A was also checked bacteriologically to determine whether they interfered with the sterilization of contaminated burs. Table 2 shows that with all the burs no growth was found after 15 minutes at 121° C. (250° F.).

Since this method of sterilization appeared effective from a bacteriologic standpoint and also offered protection from corrosion for the instruments used in the series of tests, it was decided to initiate a limited clinical study of the effect of this method of sterilization on a variety of instruments.

Eight students, operating two full days a week, were asked to sterilize all instruments, except injection needles and syringes, gold foil pluggers, and rubber goods, in the autoclave after an immersion of instruments in the emulsion A

Table 2 • Bacteriologic results of the effects of two emulsions plus autoclaving on dental burs* (121° C., 15 min.)

Inoculum	Emulsion AC-10				Emulsion A			
	No. of burs tested	No. of tests made	Results		No. of burs tested	No. of tests made	Results	
			Pos.	Neg.			Pos.	Neg.
24 hour culture unheated	24	1	0	24	0	0	0	0
5 day old culture 58° C., 10 min.	20	1	0	20	18	1	0	18

*B. Subtilis morphotype globigii used for inoculum; controls same as in Table 1.

and drainage of excess liquid. Handpieces used were S. S. White No. 9, whereas the contra-angles were of three types: S. S. White latch-type, Densco Uni-Flex, and Young's prophylaxis. All these were first cleaned thoroughly in Stoddard Solvent. After their use on each patient they were run in Stoddard Solvent, then in emulsion, and placed in the autoclave. The other instruments were scrubbed in soap and water, dipped into emulsion, drained and autoclaved.

During the approximately ten weeks of the study, it was found that in order to allow the release of moisture from the internal aspects of the handpieces and contra-angles, they were best disassembled when autoclaved; otherwise, on long standing some corrosion resulted. This disassembly was accomplished easily. Occasional additional lubrication was made in some instances. There still appeared to be a need for detailed cleaning of the rotating instruments periodically. All other instruments, including the hand chisels, scissors and pliers, appeared to be well protected. No significant oil film could be detected on any of the instruments.

One group of special plain carbon steel chisels used in surgery and already displaying some corrosion appeared to corrode further while this procedure was used. All other instruments reacted satisfactorily in the one surgical room in which this method of sterilization was carried out for the ten week period.

Thus, the results of this limited clinical application of the use of an oil-in-water emulsion dip for the protection of instruments during autoclaving appear encouraging. Further study on varying the type of oil and concentration, the length of "dry-out" period in the autoclave, the effect on various types of cutting steel, and the general mechanism of this technic shall be carried out. At this time it appears that an additional corrosion inhibitor will need to be added to the oil-in-water emulsion to provide complete anticorrosive protection for all of the instruments.

SUMMARY

Sterilization of instruments can be accomplished rapidly at 121° C. (250° F.) in modern autoclaves. The corrosion which occurs with some instruments because of the moisture and heat can be reduced significantly or eliminated by the use of an oil-in-water emulsion dip prior to autoclaving. This oil-in-water film on the instrument does not hinder the sterilization process. A limited clinical study on the use of this technic has been encouraging.

The response of oral tissues to ultrasound

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The effect of rotary instruments and the air abrasive device on the pulp and supporting structures of the teeth has been extensively investigated;[1-6] but reports on changes in the dental pulp and, particularly, in the periodontal membrane, alveolar bone and temporomandibular joint after the use of ultrasonic vibrations, are few. This study investigates these structures in an attempt to shed light on the effects of the vibrations on living tissue.

Reports on the use of commercial ultrasonic machines to cut tooth structure were made by Oman and Applebaum[7] in 1952, and by Catuna[8] in 1953. An account of the demonstration of an ultrasonic dental drill appeared in the *British Dental Journal*[1] in 1954. In March of that year Nielsen, Richards and Wolcott[9] reported the development of a dental ultrasonic machine operating at 25 kilocycles per second; and in November, Balamuth[10] reported another that operated at 29 kilocycles per second. The machine described by Balamuth was made available to the dental profession that same year.

REPORTED EFFECTS OF ULTRASONIC VIBRATIONS ON DENTAL PULP

When dentin is cut with conventional instruments, the immediate effect is mild irritation of odontoblastic processes with subsequent repair.[11] The severity of inflammation, hyperemia, decreased circulation and pulp necrosis, as well as hypoplastic dentinal response or accelerated dentin formation will, in the main, depend on the duration, pressure and extent of the cutting.[12-16]

Hansen and Nielsen[17] presented data obtained from a limited study of the com-

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†Colonel, Dental Corps, United States Army. Chief, oral pathology branch, Armed Forces Institute of Pathology.

1. The ultrasonic drill; demonstration at the annual meeting. Brit. D. J. 97:96 Aug. 17, 1954.

2. American Dental Association, Council on Dental Research and Council on Dental Therapeutics. Status report on reactions of the pulp to self-curing resinous filling materials. J.A.D.A. 42:449 April 1951.

3. Manley, E. B. A preliminary investigation into the reaction of the pulp to various filling materials. Brit. D. J. 60:321 April 1, 1936.

4. Kronfeld, R. Histopathology of the teeth and their surrounding structures, ed. 3. Philadelphia, Lea & Febiger, 1949.

5. James, V. E., and Schour, I. Early dentinal and pulpal changes following cavity preparations and filling materials in dogs. Oral Surg., Oral Med. & Oral Path. 8:1305 Dec. 1955.

6. Grossman, L. I. Pulp reaction to the insertion of self-curing acrylic resin filling materials. J.A.D.A. 46:265 March 1953.

7. Oman, C. R., and Applebaum, E. Ultrasonic cavity preparation. Preliminary report. New York State D. J. 20:256 June-July 1954.

8. Catuna, M. C. Sonic energy: A possible dental application. Ann. Den. 12:100 Sept. 1953.

9. Nielsen, A. G.; Richards, J. R., and Wolcott, R. B. Ultrasonic dental cutting instrument: I. J.A.D.A. 50:392 April 1955.

10. Balamuth, L. Technical background on the Cavitron ultrasonic dental unit. Unpublished.

11. Thoma, K. H. Oral pathology, ed. 4. St. Louis, C. V. Mosby, 1954.

parative biologic response of guinea pig incisors to rotary and vibrational cutting. Length of cutting time varied from five to ten seconds. They noted that histologic alterations were more severe and more frequent in and about teeth cut by the ultrasonic instrument and consisted of disturbed amelogenesis, severe pulp changes and alterations in dentin formation. Nielsen, Colby and Scofield[18] conducted a similar study, using a commercial vibration instrument with a frequency of 29 kilocycles per second, and essentially substantiated the findings of Hansen and Nielsen. The results obtained in these two studies implied that vibration cutting produces more serious and more frequent injuries to the incisor teeth of guinea pigs than does 12,000 rpm rotary cutting. The authors pointed out that it should not be concluded from the two studies that the ultrasonic dental instrument could necessarily cause the same damage in human teeth.

In 1953 Oman and Applebaum[7] described the preparation of cavities in the teeth of one dog and one chimpanzee with the ultrasonic tool. In their progress report[19] they told of the extension of this investigation to human teeth. Cavities were prepared in teeth scheduled for extraction prior to prosthetic treatment and in 15 other teeth to be retained. In summing up the preliminary and progress reports, the authors stated that the inflammatory changes in the pulps of teeth affected by the ultrasonic handpiece were about the same as those in teeth subjected to the conventional bur when the cavities in both were filled with oxyphosphate of zinc cement.

A preliminary report by Zach and Brown[20] assaying the biological effects of an ultrasonic vibrating tool with a frequency of 29 kilocycles per second on 12 human teeth, found that with one exception, pulpal reaction was in consonance with occasional reactions to the conventional rotary bur and standard filling materials. They noted reticular atrophy of the pulp with obliteration of all details in the one exception. The authors suggest that this reaction may well have been influenced by factors other than ultrasound. Generally speaking, pulpal response in their study may be considered to have been mild.

Healey and others[21] indicated that studies of the comparative effects of rotary instruments and the ultrasonic dental unit on human teeth showed the reactions of the pulp to the use of the steel bur, the diamond stone and the ultrasonic instrument to be very similar.

Lefkowitz,[22] on the basis of a study conducted at Ohio State University, reported that the effects on the pulps of canine teeth were the same for the ultrasonic dental instrument as for conventional methods of cutting tooth structure.

METHODS AND MATERIALS

Fifteen young adult dogs, whose weight averaged 27.6 lbs., were used as experimental animals. The dentition of each dog was complete and no evidence of

12. Balamuth, L. Personal communication.

13. Lisant, V. F., and Zander, H. A. Thermal injury to normal dog teeth: In vivo measurements of pulp temperature increases and their effect on the pulp tissues. J. D. Res. 31:548 Aug. 1952.

14. Fish, E. W. As cited by Gurley, W. B., and Van Huysen, G., in Histologic response of the teeth of dogs to operative procedures. J. D. Res. 19:179 April 1940.

15. Gurley, W. B., and Van Huysen, G. Histologic changes in teeth due to plastic filling materials. J.A.D.A. & D. Cosmos 24:1806 Nov. 1937.

16. Fry, W. J., and others. Physical factors involved in ultrasonically induced changes in living systems. J. Acoustical Soc. Am. 22:867. 1950.

17. Hansen, L. S., and Nielsen, A. G. Comparison of tissue response to rotary and ultrasonic dental cutting procedures. J.A.D.A. 52:131 Feb. 1956.

18. Nielsen, A. G.; Colby, A., and Scofield, H. Tissue response to ultrasonic cutting. Unpublished.

19. Oman, C. R., and Applebaum, E. Ultrasonic cavity preparation. II. Progress report. J.A.D.A. 50:414 April 1955.

20. Zach, L., and Brown, G. N. Pulpal effect of ultrasonic cavity preparations; preliminary report. New York State D. J. 22:9 Jan. 1956.

21. Healey, H. J.; Patterson, S. S., and Van Huysen, G. Pulp reaction to ultrasonic cavity preparation. U. S. Armed Forces M.J. 7:685 May 1956.

22. Lefkowitz, W. Ultrasonics as applied to dentistry. Presented before Mid-Winter Meeting, Chicago Dental Society, February 7, 1956.

Table 1 • Dog identification numbers by groups and experimental periods

Group	Experimental period (days)		
	2	10	30
	Dog number		
I	663	654	660
II	651	666	656
III	652	662	664
IV	665	655	653
V	658	668	657

abrasion, caries, malocclusion or other oral disease was noted. A physical examination was given each dog by a veterinarian and was negative in every instance.

The dogs were divided into five groups of three each (Table 1). All animals were anesthetized with intravenous thiopental sodium, after which an intratracheal tube was inserted. Dorsoventral and lateral headplate roentgenograms were taken of each dog to determine the presence or absence of bone changes. The animal was then returned to the operating room and anesthesia maintained by use of ether-oxygen.

The Cavitron[23] with a tip 10 by 4.75 by .5 mm. was used to prepare all cavities. A new tip was used for each preparation throughout the experiment. An occlusal cavity preparation was made on all maxillary left first molars.

Buccal and lingual cavity preparations were made on all maxillary left canines and mandibular left first molars and canines. Preparations were made at the middle and lower third of the buccal or lingual surfaces. The time for cavity preparation differed in the five groups as shown in Table 2. The "maximum cavity

23. Balamuth, L. Technical aspects of the Cavitron ultrasonic process in dentistry. Unpublished.

Table 2 • Cavity preparation time for maxillary and mandibular teeth in each group of animals

Location and tooth	Surface prepared	1st group maximum time (seconds)*	2nd group ½ maximum time (seconds)	3rd group ¼ maximum time (seconds)	4th group ⅛ maximum time (seconds)	5th group 1/16 maximum time (seconds)
Maxilla (left)						
1st molar	occlusal	8	4	2	1	½
canine	buccal	4	2	1	½	¼
	lingual	4	2	1	½	¼
Total cavity preparation time for maxilla of each animal by group		16	8	4	2	1
Mandible (left)						
1st molar	buccal	6	3	1½	¾	⅜
	lingual	6	3	1½	¾	⅜
canine	buccal	4	2	1	½	¼
	lingual	4	2	1	½	¼
Total cavity preparation time for mandible of each animal, by group		20	10	5	2½	1¼
Total cavity preparation time for each animal, by group		36	18	9	4½	2¼

*This group received maximum cavity preparation time in each instance.

preparation" time referred to in the table was determined in a pilot study and represents the uninterrupted time required for preparing a cavity on the occlusal surface, extending from the mesial to the distal marginal ridge. For buccal preparations the "maximum cavity preparation time" indicates the time required to prepare a cavity extending from mesiobuccal border to distobuccal border. For lingual preparations the "maximum cavity preparation time" indicates the time required to prepare a cavity extending from a mesiolingual border to a distolingual border. As Table 2 shows, the teeth of Group I were exposed to the "maximum cavity preparation time," whereas succeeding groups were exposed to progressively diminishing periods. Cavities were prepared by advancing the vibrating tip with light, guiding finger pressure approximately 2 mm. into the tooth structure and then laterally. All cavities were prepared, insofar as possible, the same depth and width; but extension depended on the cutting time for each group. Each prepared cavity was filled with silver amalgam. Contralateral teeth of the same dog were used as controls.

The first animal of each group was sacrificed at two days, the second at ten days, and the third at 30 days. Block sections of the teeth were made, decalcified, embedded in paraffin, sectioned at 6 microns and stained with hematoxylin and eosin.

RESULTS

As the essential structures and histophysiologic features of canine teeth and molars are relatively the same, the experimental teeth of each dog are described collectively. Reference is made to a specific tooth in instances in which there was a striking pathologic change. All other comments apply generally to the experimental teeth of the animal being discussed.

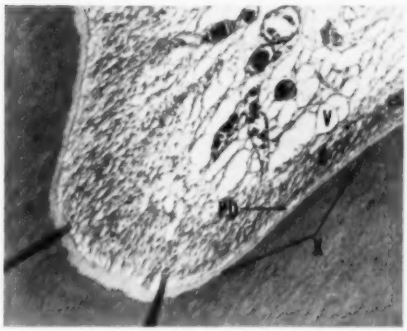

Fig. 1 • High power magnification of section through upper left first molar of dog no. 663, Group I, two days postoperatively. Note that in area X the width of predentin, PD, is reduced. The width of the odontoblastic, O, layer corresponding to this region is also reduced in width. Pulp tissue underlying this region shows vacuolization. V

Group 1; Maximum Cavity Preparation Time • Two days postoperatively, the calcified dentin which was exposed to the cavity preparation was essentially unchanged. On the pulpal surface, however, the band of predentin was reduced to about half its normal width. It was narrower, not only as compared to the control, but also as compared to the other regions of the pulp chamber of the experimental tooth (Fig. 1). The width of the predentin in the regions of the cavity preparation appeared to vary with the depth of the cavity. Tubules from the wall of the cavity preparation, when traced to their pulpal termination, showed greater amounts of predentin than those at the pulpal floor of the cavity preparation.

The odontoblastic layer in the region of the cavity preparation was somewhat reduced in thickness. Striking changes noted in the upper portion of the pulp chamber included severe intercellular edema, engorged blood vessels and lymph channels, and vacuolization, which resembled the changes described[24] in early stages of reticular degeneration.

At ten days, a calciotraumatic response

could be seen near the pulpal surface of the cut dentin in the upper molar (Fig. 2). It consisted of a band of hypercalcified, dark blue dentin which followed the accretional pattern of dentin formation. The location of this band corresponded to the tubules which extended from the sides of the cavity preparation.

The molars, as well as the canine teeth, displayed evidence of a reduction in the rate of dentinogenesis. This was most prominent in the canine tooth, where notching of the pulpal wall was seen. In the molar teeth, particularly the upper, the globular pattern of calcification in the postexperimental dentin was accentuated.

The odontoblasts in this group of teeth were disorganized and their nuclei were staggered. The upper part of the pulp chamber showed edema, vascular ectasia, dilated lymph channels and some regions of vacuolization. In both odontoblastic and subodontoblastic connective tissue, a large number of extravascular erythrocytes were seen.

At 30 days a calciotraumatic band was evident (Fig. 3). This band corresponded to the cut dentin, and the one in the upper molar extended beyond the region of the cavity preparation. In the dentin under the floor of the cavity preparation, the calciotraumatic band reached the pulpal surface, but elsewhere was separated from it by a wide zone. Since formation of the calciotraumatic band coincided with the time of cavity preparation, the orientation of the band indicated the rates of growth in the postoperative dentin. It was seen, therefore, that dentin formation in the deepest portion of the cavity had either ceased or was considerably retarded (Fig. 3).

The pulp of the upper left molar showed the most striking changes. The zone of odontoblasts under the floor of the cavity preparation was narrower, and the odontoblasts were shorter than normal. Some portions of the pulp in the vicinity of the cavity floor contained homogeneous, eosinophilic intercellular material. Fibrosis was apparent throughout the pulp tissue.

Group II; One-Half Maximum Cavity Preparation Time • Two days postopera-

24. Kronfeld, R. Histopathology of the teeth, ed. 3. Philadelphia, Lea & Febiger, 1949, p. 93-95.

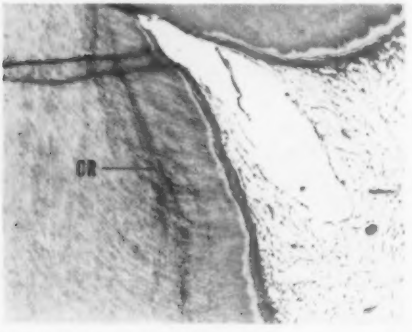

Fig. 2 • Longitudinal section through upper left first molar in dog no. 654, Group I, ten days postoperatively. Note calciotraumatic response, CR

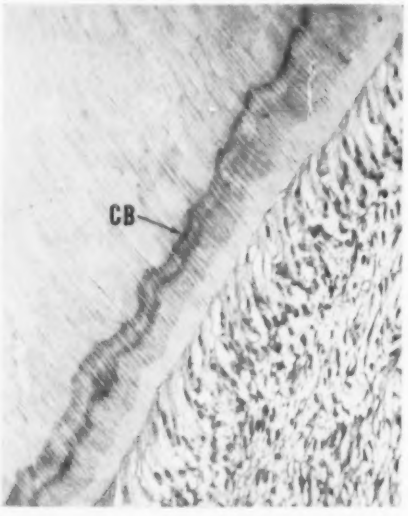

Fig. 3 • Frontal section through lower left first molar of dog no. 660, Group I, 30 days postoperatively, showing a calciotraumatic band, CB

tively, on the pulpal surface of the dentin exposed to the Cavitron, the predentin was absent or reduced in width. The odontoblasts were smaller than usual, and in regions where the predentin was missing, they appeared flattened, whereas normally they are columnar. Vacuolization, vascular engorgement and lymphatic dilatation were noted. At ten days a deeply basophilic calciotraumatic response could be seen at the pulpal ends of the cut dentinal tubules in one of the teeth (Fig. 4). It was located just above the layer of predentin, indicating that the rate of dentin formation had been considerably retarded. The layer of predentin in all the experimental teeth was either narrowed in varying degree or was missing.

The pulpal change consisted of reduction in the width of the odontoblastic layer. These cells not only were less numerous, but also appeared cuboidal. This change was particularly evident in canine teeth. Again, vascular and lymphatic dilatation was a prominent feature.

At 30 days, a well-delineated calciotraumatic band was apparent (Fig. 5). This change could be best studied in the lower left molar, where the band distinctly separated the preoperative and postoperative dentin (Fig. 6). In the region of the cavity preparation, the band was close to the pulp, whereas toward the apical part of the tooth, it receded progressively from the pulpal surface of the dentin (Fig. 6). This suggested a difference in the rate of dentin formation in the region of the cavity preparation and elsewhere. The postoperative dentin in some regions of the cavity preparation contained relatively few tubules and cellular inclusions (Fig. 7). All dentinal tubules from the floor of the cavity preparation approached the calciotraumatic band, but only a few of them extended past it into the postoperative dentin.

The odontoblastic layer appeared disorganized and reduced in width and the nuclei were staggered. The subodontoblastic pulpal tissue showed edema, vacuolization, and many regions of fibrosis.

Group III; One-Quarter Maximum Cavity Preparation Time • Two days postoperatively, the changes in the dentin were not striking. On the pulpal surface of the cut dentin, the width of the layer of predentin was slightly reduced. The coronal portion of the pulpal tissue near the cavity preparation showed vacuolization and some vascular and lymphatic dilatation.

At ten days, a calciotraumatic band in the upper left molar was separated from the predentin by a layer of normally calcified dentin, varying in width with the depth of the cavity. Where the cavity was deepest, the calciotraumatic band was closest to the predentin. This indicated that postexperimental dentinogenesis was unequally retarded. The calciotraumatic band in the lower molar was closer to the pulpal surface than the band in the upper molar. The predentin on the pulpal surface of the cut dentin in all teeth was absent or reduced in width, seldom exceeding half the normal.

The odontoblasts in regions corresponding to the cut dentin and the reduced layer of predentin were shortened and, in some places, disoriented. Lymphatic and vascular ectasia was apparent.

At 30 days, the calciotraumatic response was seen (Fig. 8 and 9). The distance of the calciotraumatic band from the pulpal surface varied in the same tooth as well as in different teeth and was directly related to the depth of the cavity preparation, being shortest where the cavity was deepest. This characteristic of the calciotraumatic band indicated not only a qualitative but also a quantitative alteration in the postexperimental dentin. The fibrosis present did not always subtend the regions of cavity preparation.

Fig. 4 • Longitudinal section through upper left first molar of dog no. 666, Group II, ten days postoperatively. Note calciotraumatic response, CR, close to pulpal surface, indicating severe retardation in dentin formation. The region corresponds to deepest portion of cavity preparation, CA

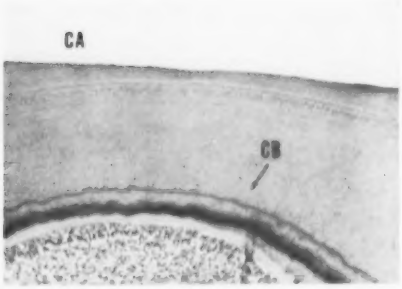

Fig. 5 • Cross section through upper left canine of dog no. 656, Group II, 30 days postoperatively, showing calciotraumatic band, CB, in relation to cavity preparation, CA. In the band, note appearance in chronologic order of calciotraumatic line, hypocalcified layer and hypercalcified layer

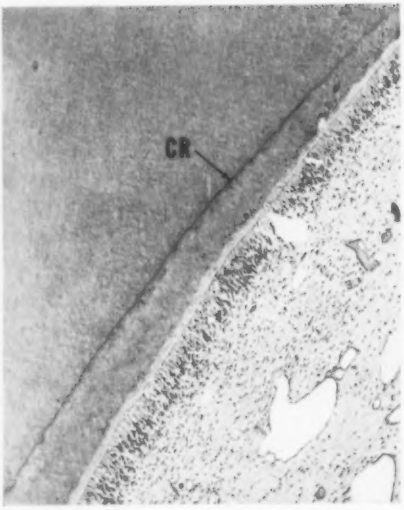

Fig. 6 • Longitudinal section through lower left first molar of dog no. 664, Group III, 30 days postoperatively. Distance between calciotraumatic response, CR, and pulpal surface increases from coronal to apical portion of tooth

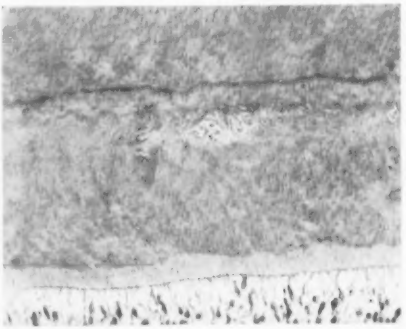

Fig. 7 • Frontal section through lower left first molar of dog no. 656, Group II, 30 days postoperatively, showing cellular inclusions

Group IV; One-Eighth Maximum Exposure Time • Two days postoperatively, the dentin was essentially normal. In the region of the pulpal horns closest to the cavity preparation, edema was evident and in one place a large cyst could be seen (Fig. 10). This cystic space was lined by flattened mesenchymal cells and was surrounded by eosinophilic intercellular material. Limited dilatation at lymph channels and blood vessels was noted.

At ten days, although no calciotraumatic response was seen, the layer of predentin in the region of the cut dentin appeared reduced in width, the odontoblasts were shortened and the pulp tissue showed some vascular ectasia.

At 30 days, the dentin was unchanged, but the coronal part of the pulp contained a large empty space which was lined by flattened mesenchymal cells. Scattered regions of fibrosis were present.

Group V; One-Sixteenth Maximum Exposure Time • Two days postoperatively, nothing unusual could be seen in the experimental teeth.

At ten days, the dentin showed no abnormal change. In the subodontoblastic pulpal tissue, large numbers of homogeneous eosinophilic bodies resembling erythrocytes could be seen.

At 30 days, the layer of predentin was reduced in width and some fibrosis was noted (Fig. 11).

DISCUSSION

Filling Material • Since the purpose of this experiment was to determine whether a dental ultrasonic apparatus produced any deleterious effects on the teeth or their supporting structures, the choice of a restoration for the prepared cavity was extremely important. It has been shown that zinc oxide and eugenol, calcium hydroxide, and silver amalgam complicate the postexperimental changes least. Since in dental practice silver amalgam is the material most frequently used, it was selected for this experiment.

Dentinal Reaction to Ultrasonic Vibration • The changes in dentin were greatest in Group I, which received the maximum exposure to the ultrasonic vibrations, but were also present in Groups II and III. These changes consisted of (1) calciotraumatic response, (2) absence or reduction in width of the predentin layer and (3) the formation of irregular dentin. Since such changes have not been noted in dog teeth[5] in which cavities were prepared by bur or air abrasive and filled with amalgam, it may be assumed that they are a dentinal response to ultrasonic vibration. In Groups IV and V the dentin was relatively unaffected.

A calciotraumatic response was seen in teeth of all animals of Groups I, II, and III which were sacrificed ten and 30 days postoperatively. The response usually consisted only of a hypercalcified band, although sometimes a faintly hypocalcified region was noted at the pulpal edge. In some teeth the calciotraumatic band formed in only that part of the cut dentin corresponding to the deepest portion of the cavity. Thus, it may be concluded that dentin formed immediately after exposure to ultrasonic vibration at 29 kilocycles per second is abnormal, and that this abnormality is probably the result of a disproportion in the ratio of fibrils to cementing substance.

The calciotraumatic response, when present, was used as a guide in determining the type and estimating the rate of growth of the postoperative dentin. With this as a point of reference, it could be seen that the distance between this band and the pulpal surface of the dentin was narrowest where the cut into the dentin was deepest; where only a shallow cut was made on the dentin, the distance between the band and the pulpal margin was greater. This would further establish that the response of the odontoblasts is

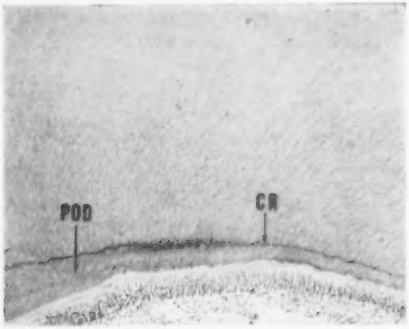

Fig. 8 • Longitudinal section through lower left first molar of dog no. 664, Group III, 30 days postoperatively. Note calciotraumatic response, CR, and progressive increase in width of postoperative dentin, POD, from right to left. Width of postoperative dentin is in inverse proportion to depth of cavity.

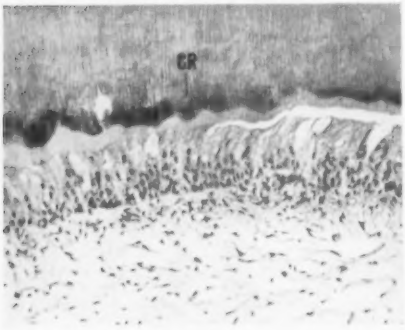

Fig. 9 • Longitudinal section through upper left first molar of dog no. 664, Group III, 30 days postoperatively. Relation between calciotraumatic response, CR, and pulp indicates a decrease in postexperimental dentinogenesis from right to left. Width of postoperative dentin is related inversely to depth of cavity.

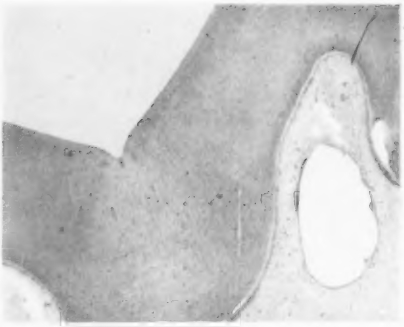

Fig. 10 • Longitudinal section of upper left first molar of dog no. 665, Group IV, two days postoperatively. Note cyst formation.

Fig. 11 • Longitudinal section through upper left first molar of dog no. 657, Group V, 30 days postoperatively, showing some fibrosis.

not only qualitative but is also quantitative.

The absence of the predentin layer was seen in teeth of the dogs in Groups I and II, particularly in regions where the tubules were cut closest to the pulp. The pre-experimental predentin in these regions apparently became calcified and no further predentin was formed. The absence of a predentin layer might be explained by the fact that the odontoblastic layer subtending these areas was reduced from tall columnar to cuboidal-appearing cells, possibly indicating damage to the cell and interference with its role in the formation of predentin.

In several teeth, the postexperimental dentin, as demarcated by the calciotraumatic response, was irregular. It consisted of fewer tubules than normal and some cellular inclusions. Some of the dentinal tubules of the pre-experimental dentin extended uninterruptedly across the calciotraumatic response into the experimental dentin, whereas others stopped abruptly at the band. Since each tubule represents a single odontoblast, it is obvious that some of the odontoblasts functioning at the time of the cavity preparation subsequently degenerated.

Pulpal Response to Ultrasonic Vibration • Great changes in the pulp were seen in teeth of dogs of Groups I, II and III. These consisted of changes in the odontoblastic layer and changes in the pulp tissue proper.

Changes in the odontoblastic layer consisted of a reduction in the height and number, disorganization and vacuolization of odontoblasts. The cells, instead of being tall and columnar, appeared cuboidal and sometimes flattened and fusiform, thus reducing the over-all width of the odontoblastic layer. Since the dentin in these teeth was abnormal, the changes in the cells (odontoblasts) that influenced dentin production were not unexpected. Vacuolization of the odontoblastic layer apparently was caused by intercellular accumulation of fluid.

Ectasia of lymph and blood vessels was seen in the pulps of experimental animals of Groups I, II and III, sacrificed at two days and ten days. Congested blood vessels and lymph channels were not exceptional in the animals sacrificed at 30 days.

At two days and ten days postoperatively, the normally fine fibrous stroma of the pulp was condensed in many regions into coarse strands, and it surrounded many vacuoles. Large cystic cavities lined by fibrous pulp tissue and flattened mesenchymal cells were also seen. It appeared that these vacuoles and cystic cavities resulted from pulpal edema.

In the pulp tissue, evidence of frank inflammation was absent. Previous studies[2, 5, 15, 25-28] have shown that the pulp responds to bur or air abrasive preparations with inflammation, which may persist as long as three weeks after cavity preparation. The fact that the ultrasonic dental machine did not elicit an inflammatory response in the pulp has been demonstrated previously.[20] If the impact of the instrument is such that within two days changes are discernible in the pulp, it would be assumed that the normal body response to such injury would be inflammation; and, in the absence of inflammation, necrobiosis might be expected if the injury were severe enough. The effect of ultrasonic vibration seems to be a sudden, severe injury to the odontoblastic layer and pulp, which transcends the body's most common defense mechanism, inflammation. Such effects as vacuolization and edema of pulp tissue, disruption, death or decrease in

25. Zander, H. A. Reaction of dental pulps to silicate cements. J.A.D.A. 33:1233 Oct. 1946.

26. Silberkweit, M., and others. Effects of filling materials on the pulp of the rat incisor. J. D. Res. 34:854 Dec. 1955.

27. Shroff, E. F. Effects of filling materials on the dental pulp: an histological experimental study with special reference to synthetic porcelain. New Zealand D.J. 42:99 July 1946; 42:145 Oct. 1946; 43:35 Jan. 1947.

28. James, V. E.; Schour, I., and Spence, J. M. Response of human pulp to gutta-percha and cavity preparation. J.A.D.A. 49:639 Dec. 1954.

size of cells and vacuolization of the odontoblastic layer may represent stages of a necrobiotic response of the pulp tissues to ultrasonic vibration. Most of these changes appear to be reversible; for example, active fibrosis of the pulp in the experimental animal sacrificed after 30 days may be interpreted as an attempt to counteract changes brought about by cavity preparation. Recovery of the pulp from changes ascribed to ultrasonic vibration does not follow the general pattern of injury and repair, as seen in other studies using other means of cavity preparation and other filling materials.

Several teeth from animals of Groups I, II and III showed extravascular erythrocytes in the pulp immediately below the cavity preparation. This finding may indicate a form of vascular injury; however, as it was present in only four cases, no conclusion can be drawn.

Effects on the Periodontal Membrane, Alveolar Bone, Temporomandibular Joint, Interpremaxillary Suture and Intermandibular Suture Regions • These structures appeared to be unchanged. Since reports in the literature[29] have shown that ultrasonic waves travel in bone and in soft tissue up to distances of 203 cm. and 80 cm., respectively, before being absorbed (at 29,000 cps), study of these structures was considered essential. However, the absence of any morphologic evidence of alteration does not necessarily indicate that changes may not occur. This aspect of ultrasonics is considered an important field for further experimentation, particularly since the present study is not based on complete serial sections.

Artefacts • It is important to recognize the possibility of a parallel error due to autolysis when examining the sections of this study. It is almost impossible to determine what findings may be due to artefact; certainly there are some. However, all tissues examined were rigidly controlled and only those changes that were separate and distinct from those in the controls were reported. Artefact from trauma of surgical removal of teeth from bone does not exist in this study, as sections were made of the maxilla and mandible with teeth intact.

SUMMARY AND CONCLUSIONS

This histologic study on the effect of the ultrasonic dental machine on teeth, their supporting structures, interpremaxillary and intermandibular suture regions and the temporomandibular joint was carried out on 15 young adult dogs which were divided into five groups. Each group consisted of three animals. Cavities were prepared in the canines and first molars on the left side, and the contralateral teeth were used as controls. Each group received a total exposure time of 36 minutes, 18 minutes, 9 minutes, 4½ minutes or 2½ minutes. The three dogs in each group were sacrificed by perfusion of 10 per cent Formalin at 2, 10 and 30 days postoperatively. Block sections were made of various portions of the jaws; these were decalcified, embedded in paraffin, sectioned and stained with hematoxylin and eosin.

The findings were as follows:

1. Changes were directly related to the exposure time and were seen chiefly in Groups I, II and III.

2. Changes in the dentin consisted of a calciotraumatic response, reduction in growth rate of postexperimental dentin, reduction in width, or absence of predentin and formation of irregular dentin.

3. Changes in the odontoblastic layer consisted of reduction in height of odontoblasts to a cuboidal form, disorganization, vacuolization and, occasionally, necrosis of the cell.

4. The pulp tissue proper showed congested blood vessels and lymph channels, vacuolization, edema, fibrosis and, in three teeth, "cyst" formation.

29. Balamuth, L. Personal communication.

5. Inflammatory cellular exudate of the pulp was not seen.

6. The periodontal membrane, the alveolar bone, the interpremaxillary and intermandibular suture regions, and the temporomandibular joint showed no discernible changes.

7. The dynamics of the reactions over a period of time for all groups showed that the dogs sacrificed after two days and ten days sustained damage to the odontoblastic layer and to pulp tissue. The dogs sacrificed after 30 days showed good evidence of recovery. No changes from which recovery was not possible were noted in the oral soft and hard tissues of the animals used in the experiment.

Use of epinephrine with local anesthesia in hypertensive patients IV. Effect of tooth extraction on blood pressure and pulse rate

E. Cheraskin, M.D., D.M.D., and T. Prasertsuntarasai,† D.D.S., M.S., Birmingham, Ala.*

In a first report[1] it was shown that the systolic, diastolic, mean and pulse pressures of the normotensive and hypertensive dental patient in the waiting room are significantly higher than those obtained under basal conditions. In a second publication[2] it was demonstrated that only the systolic, mean and pulse pressures of the hypertensive patient in the waiting room could be significantly reduced in 45 minutes by the oral administration of 1½ grains of secobarbital. In a third report[3] the experience in the dental chair was further studied by examining the blood pressure and pulse rate variations after the injection of lidocaine hydrochloride with and without epinephrine in sedated and nonsedated normotensive and hypertensive patients prior to dental extraction. The conclusion was drawn that the blood pressure and pulse rate five and ten minutes postinjection did not vary significantly.

It is the aim of this fourth report to

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†Section on oral surgery, University of Alabama School of Dentistry.

1. Cheraskin, E., and Prasertsuntarasai, T. Use of epinephrine with local anesthesia in hypertensive patients. I. Blood pressure and pulse rate observations in the waiting room. J.A.D.A. 55:761 Dec. 1957.

2. Cheraskin, E., and Prasertsuntarasai, T. Use of epinephrine with local anesthesia in hypertensive patients. II. Effect of sedation on blood pressure and pulse rate in the waiting room. J.A.D.A. 56:210 Feb. 1958.

3. Cheraskin, E., and Prasertsuntarasai, T. Use of epinephrine with local anesthesia in hypertensive patients. III. Effect of epinephrine on blood pressure and pulse rate. J.A.D.A. 57:507 Oct. 1958.

continue the study of the dental patient as he moves along through the dental experience by now investigating the effect of tooth extraction on blood pressure and pulse rate. As far as can be determined, this phase of the dental experience has never been studied in terms of the blood pressure and pulse rate.

METHOD OF INVESTIGATION

It should be recalled[1] that the procedure followed in this study was designed to reproduce, as nearly as possible, the situation which prevails in the average dental office. In the first portion of the study, attention was focused on the blood pressure and pulse rate of the patient while seated in the waiting room anticipating tooth extraction.[1] After measurements were taken, the patient was given a red capsule containing either 1½ grains of secobarbital or a placebo. Precisely 45 minutes later the patient was ushered into the operatory and seated in the dental chair. The effect of sedation was summarized in a second report.[2] After the patient was comfortably seated in the dental chair and the anesthetic armamentarium placed on the bracket table, the blood pressure and pulse rate were measured again. Immediately thereafter, a matter of two minutes after the patient was ushered into the dental chair, the local anesthetic solution was injected. In some instances, the solution contained epinephrine; in other instances no epinephrine. Precisely five and ten minutes postinjection, blood pressure and pulse rate determinations were made. These findings have been summarized in a third report.[3]

In this phase of the study the blood pressure and pulse rate were determined at the start and completion of the tooth extraction. The question might be raised as to what constitutes the start of a dental extraction. It should be recalled that this entire experiment was designed in such a fashion as to simulate the procedure followed in the average dental practitioner's office.[1] In keeping with this policy, a survey was conducted to learn how the average dental practitioner extracts a tooth. The survey showed that it is customary first to free the periodontal tissues with a periosteal elevator before the forceps is applied. Thus, in order to maintain the philosophy of the experiment,[1-3] it was felt that the tissues should first be freed before the application of the forceps. The start of the extraction, for purposes of this study, was just after the freeing of the periodontal tissues and just prior to the application of the forceps.

RESULTS

This report will consider the changes in blood pressure and pulse rate which occurred between: (1) ten minutes postinjection and the start of the dental extraction, and (2) the observations at the start and end of the extraction experience. The code used for the various groups of patients in the tabulation of data is given in Table 1.

Comparison of Observations Ten Minutes Postinjection and at the Start of the Tooth Extraction • A comparative study of observations made ten minutes postinjection and at the start of tooth extraction is summarized in Tables 2-6. It will be noted (Table 2) that the greatest deflections in systolic pressure occurred, in the main, in the hypertensive subjects. However, those sedated normotensive subjects who received no epinephrine also showed considerable variation. It is of particular interest that two groups (sedated normotensive patients without epinephrine and nonsedated hypertensive patients without epinephrine) showed rather significant increases in systolic pressure ($P < 0.025$ and < 0.01 respectively). In contrast, Table 3 demonstrates only minor increases in diastolic pressure in all groups. Consistent with the findings in systolic pressure

Table 1 • Code used in tabulation of data

Code	Group
NNE	Nonsedated normotensive group with epinephrine
NN	Nonsedated normotensive group without epinephrine
SNE	Sedated normotensive group with epinephrine
SN	Sedated normotensive group without epinephrine
NHE	Nonsedated hypertensive group with epinephrine
NH	Nonsedated hypertensive group without epinephrine
SHE	Sedated hypertensive group with epinephrine
SH	Sedated hypertensive group without epinephrine

Table 2 • Comparison of systolic pressure levels obtained ten minutes postinjection and at start of extraction

Groups	No. of patients	Degree of freedom	Mean 10 min. postinjection systolic pressure	Mean systolic pressure at start of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	129.5	134.6	5.1	6.5	.8	>0.05
NN	19	36	125.5	134.5	9.0	6.7	1.3	>0.05
SNE	12	22	123.3	126.7	3.4	9.9	.3	>0.05
SN	17	32	124.4	138.1	13.7	5.6	2.5	<0.025
NHE	10	18	168.1	184.8	16.7	7.3	2.3	<0.05
NH	10	18	163.2	192.0	28.8	7.8	3.7	<0.01
SHE	31	60	173.2	184.0	10.8	5.2	2.1	<0.05
SH	15	28	172.3	189.9	17.6	8.7	2.0	>0.05

Table 3 • Comparison of diastolic pressure levels obtained ten minutes postinjection and at start of extraction

Groups	No. of patients	Degree of freedom	Mean 10 min. postinjection diastolic pressure	Mean diastolic pressure at start of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	74.2	78.0	3.8	4.0	1.0	>0.05
NN	19	36	80.2	82.8	2.6	3.8	.7	>0.05
SNE	12	22	76.6	78.0	1.4	5.6	.3	>0.05
SN	17	32	76.1	82.2	6.1	5.0	1.2	>0.05
NHE	10	18	105.3	111.7	6.4	7.1	.9	>0.05
NH	10	18	100.0	109.8	9.8	4.5	2.2	<0.05
SHE	31	60	102.2	106.2	4.0	3.1	.1	>0.05
SH	15	28	107.2	112.9	5.7	4.7	1.2	>0.05

Table 4 • Comparison of mean pressure levels obtained ten minutes postinjection and at start of extraction

Groups	No. of patients	Degree of freedom	Mean 10 min. postinjection mean pressure	Mean mean pressure at start of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	101.8	106.3	4.5	5.0	.9	>0.05
NN	19	36	102.8	108.7	5.9	5.0	1.2	>0.05
SNE	12	22	100.0	102.3	2.3	7.4	.3	>0.05
SN	17	32	100.2	110.1	9.9	4.9	2.0	>0.05
NHE	10	18	136.7	148.3	11.6	6.1	1.9	>0.05
NH	10	18	131.6	150.9	19.3	5.3	3.6	<0.01
SHE	31	60	137.7	145.1	7.4	3.6	2.1	<0.05
SH	15	28	139.7	151.4	11.7	6.4	1.8	>0.05

Table 5 • Comparison of pulse pressure levels obtained ten minutes postinjection and at start of extraction

Groups	No. of patients	Degree of freedom	Mean 10 min. postinjection pulse pressure	Mean pulse pressure at start of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	55.2	56.5	1.3	4.0	.3	>0.05
NN	19	36	45.3	51.7	6.4	4.3	1.5	>0.05
SNE	12	22	46.6	48.7	2.1	6.4	.3	>0.05
SN	17	32	48.3	55.8	7.5	4.0	1.9	>0.05
NHE	10	18	62.8	73.1	10.3	7.9	1.3	>0.05
NH	10	18	63.2	82.2	19.0	7.0	2.7	<0.025
SHE	31	60	71.0	77.7	6.7	4.5	1.5	>0.05
SH	15	28	65.1	77.0	11.9	5.6	2.1	<0.05

Table 6 • Comparison of pulse rate levels obtained ten minutes postinjection and at start of extraction

Groups	No. of patients	Degree of freedom	Mean 10 min. postinjection pulse rate	Mean pulse rate at start of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	80.2	84.8	4.6	3.9	1.2	>0.05
NN	19	36	83.9	87.7	3.8	3.7	1.0	>0.05
SNE	12	22	83.3	83.6	.3	6.5	.05	>0.05
SN	17	32	79.8	83.2	3.4	3.6	.9	>0.05
NHE	10	18	82.0	86.4	4.4	5.4	.8	>0.05
NH	10	18	73.2	81.0	7.8	5.5	1.4	>0.05
SHE	31	60	88.5	92.0	3.5	3.7	.9	>0.05
SH	15	28	89.5	93.3	3.8	4.3	.9	>0.05

(Table 2) were the significant increases in mean (Table 4) and pulse (Table 5) pressures at the start of the tooth extraction in the unsedated hypertensive group not given epinephrine. Finally, Table 6 indicates the small increases in pulse rate.

Comparison of Observations at the Start and End of Tooth Extraction • Tables 7-11 show that, in just about all categories, the blood pressure and pulse rate decreased at the end of the tooth extraction. It is important to note (Table 7) that the most obvious decrements were observed in the sedated hypertensive patients who received epinephrine with the local anesthetic solution. In contrast, the reductions in diastolic pressure were small (Table 8). Consistent with the systolic pressure findings (Table 7) were the significant decreases in mean (Table 9) and pulse pressure (Table 10) at the end of the extraction procedure. Finally, there appeared to be no great reduction in pulse rate (Table 11).

COMMENT

It is clear from these data that the systolic pressure is more variable than the diastolic, mean and pulse pressures and the pulse rate. Table 2 shows that the systolic pressure significantly rises in sedated normotensive subjects not given epinephrine ($P < 0.025$) and nonsedated hypertensive patients not given epinephrine ($P < 0.01$). It appears that the common denominator is the fact that the systolic pressure significantly increased when a vasoconstrictor was not used. It is interesting to speculate why this should occur. A likely explanation is that anesthesia without a vasoconstrictor is very likely to be poor anesthesia. Thus, during the freeing of the periodontal tissues with an elevator, the patient is hurt. The pain so produced probably causes the release of endogenous epinephrine and possibly in amounts greater than those administered with the local anesthetic solution. Table 3 shows that the increments in diastolic pressure are small and insignificant. Tables 4 and 5 confirm the observations on the systolic pressure by demonstrating a significant mean and pulse pressure rise only in the nonsedated hypertensive group ($P < 0.01$ and $P < 0.025$ respectively). Finally, there is no significant change in pulse rate (Table 6).

The postextraction determinations are summarized in Tables 7-11. Table 7 emphasizes the significant decline in systolic pressure ($P < 0.01$) only in those sedated hypertensive subjects who were given epinephrine. It should be recalled that the greatest and most significant increase in systolic pressure at the start of the extraction occurred in the hypertensive subjects who received no sedation and no epinephrine. An explanation was offered. The data in Table 7 confirm the observations in Table 2, for here the sedated hypertensive patients with epinephrine fared best. Table 8 shows that the decrements in diastolic pressure are small and insignificant. Tables 9 and 10 confirm the systolic findings by demonstrating a significant mean and pulse pressure decline ($P < 0.01$ and $P < 0.025$) in the sedated hypertensive group with epinephrine. Finally, there is no significant change in pulse rate (Table 11).

CONCLUSIONS

1. In an earlier report[1] it was learned that the systolic, diastolic, mean and pulse pressures of normotensive and hypertensive patients are higher in the waiting room compared with those when the patient is in the basal state.

2. The observations in a second report[2] disclosed that the increase in systolic, mean and pulse pressure in hypertensive patients in the waiting room could be reduced significantly by the oral administration of 1½ grains secobarbital 45 minutes prior to ushering the patient to the dental chair.

Table 7 • Comparison of systolic pressure levels obtained at start of extraction and at end of extraction

Groups	No. of patients	Degree of freedom	Mean systolic pressure at start of extraction	Mean systolic pressure at end of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	134.6	128.3	6.3	6.5	1.0	>0.05
NN	19	36	134.5	131.5	3.0	7.4	.4	>0.05
SNE	12	22	126.7	117.8	8.9	8.8	1.0	>0.05
SN	17	32	138.1	131.2	6.9	6.5	1.1	>0.05
NHE	10	18	184.8	173.6	11.2	7.7	1.4	>0.05
NH	10	18	192.0	172.8	19.2	8.6	2.2	<0.05
SHE	31	60	184.0	169.8	14.2	4.7	3.0	<0.01
SH	15	28	189.9	172.8	17.1	9.4	1.8	>0.05

Table 8 • Comparison of diastolic pressure levels obtained at start of extraction and at end of extraction

Groups	No. of patients	Degree of freedom	Mean diastolic pressure at start of extraction	Mean diastolic pressure at end of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	78.0	76.0	2.0	4.3	.5	>0.05
NN	19	36	82.8	83.0	.2	3.6	.1	>0.05
SNE	12	22	78.0	76.5	1.5	5.2	.3	>0.05
SN	17	32	82.2	79.2	3.0	4.8	.6	>0.05
NHE	10	18	111.7	108.0	3.7	7.5	.5	>0.05
NH	10	18	109.8	104.1	5.7	4.8	1.2	>0.05
SHE	31	60	106.2	102.1	4.1	3.1	1.3	>0.05
SH	15	28	112.9	106.2	6.7	4.5	1.5	>0.05

Table 9 • Comparison of mean pressure levels obtained at start of extraction and at end of extraction

Groups	No. of patients	Degree of freedom	Mean mean pressure at start of extraction	Mean mean pressure at end of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	106.3	102.2	4.1	5.1	.8	>0.05
NN	19	36	108.7	107.5	1.2	5.2	.2	>0.05
SNE	12	22	102.3	97.1	5.2	6.6	.8	>0.05
SN	17	32	110.1	105.2	4.9	5.2	.9	>0.05
NHE	10	18	148.3	140.8	7.5	6.6	1.1	>0.05
NH	10	18	150.9	138.5	12.4	5.9	2.1	<0.05
SHE	31	60	145.1	136.0	9.1	3.4	2.7	<0.01
SH	15	28	151.4	139.5	11.9	6.6	1.8	>0.05

Table 10 • Comparison of pulse pressure levels obtained at start of extraction and at end of extraction

Groups	No. of patients	Degree of freedom	Mean pulse pressure at start of extraction	Mean pulse pressure at end of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	56.5	52.3	4.2	4.1	1.0	>0.05
NN	19	36	51.7	48.5	3.2	5.1	.6	>0.05
SNE	12	22	48.7	41.3	7.4	6.0	1.2	>0.05
SN	17	32	55.8	52.0	3.8	4.5	.9	>0.05
NHE	10	18	73.1	65.6	7.5	7.5	1.0	>0.05
NH	10	18	82.2	68.7	13.5	7.3	1.9	>0.05
SHE	31	60	77.7	67.7	10.0	4.3	2.3	<0.025
SH	15	28	77.0	66.5	10.5	6.6	1.6	>0.05

Table 11 • Comparison of pulse rate levels obtained at start of extraction and at end of extraction

Groups	No. of patients	Degree of freedom	Mean pulse rate at start of extraction	Mean pulse rate at end of extraction	Mean difference	Standard error of difference between means	Observed t value	P
NNE	22	42	84.8	79.0	5.8	4.3	1.4	>0.05
NN	19	36	87.7	83.2	4.5	3.9	1.2	>0.05
SNE	12	22	83.6	78.5	5.1	5.9	.9	>0.05
SN	17	32	83.2	78.8	4.4	3.8	1.2	>0.05
NHE	10	18	86.4	78.4	8.0	5.8	1.4	>0.05
NH	10	18	81.0	77.6	3.4	5.4	.6	>0.05
SHE	31	60	92.0	85.4	6.6	3.7	1.8	>0.05
SH	15	28	93.3	88.5	4.8	4.3	1.1	>0.05

3. In a third report,[3] it was shown that only small and statistically insignificant variations in blood pressure and pulse rate occur five and ten minutes after injection of a local anesthetic solution (2 per cent lidocaine) with or without epinephrine (1:100,000) in sedated (1½ grains secobarbital) or nonsedated normotensive and hypertensive patients.

4. It is clear from this study of 136 patients that significant blood pressure changes occur at the start and end of tooth extraction. Specifically, there is a statistically significant rise in systolic, mean and pulse pressure at the start of the extraction in those nonsedated hypertensive patients who did not receive epinephrine. There is also a statistically significant increment in systolic pressure at the start of tooth extraction in sedated normotensive subjects who also received no epinephrine. A statistically significant decrease in systolic, mean and pulse pressure appeared at the end of the extraction only in those sedated hypertensive patients who received epinephrine with the local anesthetic.

5. It would appear from these data that the sedated hypertensive subject given epinephrine fared better than those who did not receive sedation and a vasoconstrictor. The explanation is possibly the fact that local anesthesia without a vasoconstrictor is often poor anesthesia. Since then dental extraction will more likely produce pain, there is the risk of

endogenous epinephrine in amounts greater than those introduced with the local anesthetic solution.

SUMMARY

Under a simulated office procedure, it appears that the sedated hypertensive patient supplied with a vasoconstrictor plus local anesthetic fares better in terms of blood pressure changes than those high blood pressure patients not given sedation nor epinephrine.

It would be highly fruitful to redo this study employing the same and other sedative, local anesthetic and vasoconstrictor agents at different dosages, different routes of administration and different time intervals to establish the most suitable pre-extraction regime. It should be emphasized that this investigation represents an attempt to study cardiovascular changes under conditions which prevail in the average dental practitioner's office. In other words, this study attempts to determine not what to do but rather to relate what the average practitioner has been doing.

The use of associates in private practice

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There are many practitioners in the field of dentistry who need to have one or more associates in their offices. For those who consider the services of an associate, and for the many young dentists who are weighing whether or not to become associates instead of setting up their own offices, this paper will attempt to evaluate the pros and cons from the standpoint of each.

Before this evaluation is begun, however, the advantages and disadvantages to the new graduate, or the new man in the community, of starting his own practice will be considered. The advantages can be outlined as follows:

1. Being his own boss. There are many men who cannot follow the leadership and ideals of another. Such a man is better off being his own boss, and will be far happier from the start.

2. Building his own practice from the start. There are men who are too proud and independent ever to want help in starting their practice because the feeling of achievement is an important part of their personality.

3. Freedom to follow the technics of his own choice. The new graduate is so thoroughly involved with the technics he has learned in school that usually for at least two years after graduation he prefers the use of these technics rather than learning and using other and better ones.

4. Freedom to establish his own office procedures. Even though this can be a distinct disadvantage, many men have their own dreams of how they choose to operate their own offices, and are not too

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receptive to other men's methods. These men should be privileged to evaluate their own methods by trial and error.

5. Self-satisfaction in being independent. This is self-explanatory, and was touched on briefly earlier.

Now for a brief exploration of some of the disadvantages of a young man's starting his own practice:

1. Lack of capital, probably the most universally experienced disadvantage. There are many dentists who remember only too well what a problem lack of sufficient capital presented when they were graduated and ready to open their own offices. In this day of government aid in education, small business loans and so forth, this is not as difficult a problem as it was only a few years ago.

2. Inexperience in organizing a practice. This is not too great an obstacle, as the average man possesses reasonable ability to plan and organize. It must be remembered, however, that many do not possess this ability, and help from someone else could prove an invaluable asset.

3. Difficulty in securing immediate advice when needed. Dentists know from past experience that, on rare occasions, immediate advice can prove very helpful and is, indeed, welcome.

4. Lower income because of insufficient clientele. This, of course, most dentists have been through and, somehow, the young man always seems to weather the storm. Used to a lower scale of living, he apparently does not worry too much except about outstanding debts.

5. Inability to afford auxiliary personnel. It is useless to develop this problem, because the necessity and advantages of having adequate auxiliary personnel are known. Too often a dentist will try to carry on as long as possible without at least one assistant, falsely believing that he is saving money. By the time he realizes he is practicing false economy, he has lost a great deal of production time and prestige.

6. Lack of experience, judgment and self-assurance. There are people who firmly believe that a lesson learned the "hard way" is never forgotten. Although that usually is true in most instances, it can certainly play havoc with self-assurance. From a psychological standpoint, self-assurance is a most important asset to a dentist, as it is one of the motivating factors that make him strive to do better dentistry and to achieve greater success financially. By being able to profit from the experience of an established practitioner, a young dentist could actually gain several years in his ability to cope with certain problems. Correct judgment also can mean the difference in correct or incorrect treatment, possible loss of a good patient or even, perhaps, a malpractice suit.

ASSOCIATION FROM VIEWPOINT OF PROSPECTIVE ASSOCIATE

Advantages • The advantages of association with a well-established dentist from the standpoint of the prospective associate, for example, a fairly recent graduate, might be:

1. No investment or capital outlay. The importance of this feature has been discussed earlier in this paper.

2. Invaluable dentist-patient relations instruction. It is well known how important dentist-patient relations are, for chairside manner can prove to be most valuable in building a professional practice. Some men never are able to develop this finesse and their practices usually are not to be admired. Many things about dentist-patient relations can be learned from the established dentist.

3. Rapid growth of prestige. Patients often say of an associate, "Well, if Dr. X thinks Dr. J is good enough to be in his office, he is good enough to do my work." Strangely, patients think a dentist has many ways of finding out about the type of dentistry his associate can do before he is brought into the office. This belief is erroneous, as the only methods at hand

are to contact the school from which the prospective associate was graduated, or by ascertaining his standing in the community where he might have previously practiced. Actually, the most effective way is to employ an associate on a trial basis and observe the care with which he works and the apparent foundation he has gained in school.

4. Great practice builder. In an association with an established dentist in a busy practice, the associate will have many good patients referred to him. Many of these people will like him well enough to follow him to his own practice when his employment with the other dentist ends. Inasmuch as an indefinite association seldom exists, this must be considered as an important point.

5. Desirable patient clientele. This can work also in the opposite way, and the wise associate can see quickly when this is happening. There are some dentists who prefer to keep all the desirable patients for themselves, giving those of questionable desirability to the associate. This is a poor practice, and unfair to the young man, as it is certainly unwise to clutter up his office with this type of clientele. On the other hand, this can be good experience for the associate as it helps him early in his career to learn to evaluate patients properly. Patient evaluation, both as to their dental intelligence and financial standing, is a must to build a high-type clientele.

6. Valuable help from the more experienced man. This must be considered another asset. It is always possible that the more experienced practitioner can stimulate the young man to attend dental meetings and also encourage him to start postgraduate work early. It has been the author's experience that about the last thing a recent graduate thinks of is postgraduate work. He is tired of school and study, and thinks only of starting his career. He has to practice two or three years and observe the operations of the more experienced man before he realizes that there is more to dentistry than he learned in school. Usually only then will his hunger for more knowledge stimulate him to further study. It is just about this time that he is beginning to see daylight in his financial structure, so he feels he cannot afford the time and tuition for extra study. It can be that the more experienced man can stimulate a thirst for knowledge much sooner than normally it would be stimulated.

7. Greater monetary return in the earlier stages of practice. Being married and even having a family is no longer a rarity on graduation; in fact it is almost the rule rather than the exception. Such a situation, as well as possible indebtedness for schooling, home, furniture and so forth, is so important that many times it is the motivating factor in the young dentist's decision to associate with an established dentist.

8. Learning to work with auxiliary personnel. Many dental schools do not teach the student the use of auxiliary help. If the personnel he works with are properly trained, they can aid him greatly in learning the office routine, dentist-patient relations and, above all, how invaluable their aid is. He will learn not only their use at the chair, but many things about the secretarial department which will enable him to establish and conduct his own office and practice on a sound basis. In spite of the many lecturers discussing this subject, and the books and articles written on it, it is positively shocking to know how few dentists employ auxiliary personnel for their greatest personal benefit or even realize when more than one girl is needed in the office.

9. Determining appropriate dental fees. Because of lack of knowledge of the fees in the community, and certainly because of lack of experience and self-confidence, the new practitioner usually undervalues his services. Many times, erroneously, he thinks lower fees might stimulate a quicker influx of patients. If it does stimulate such an influx, it is usu-

ally the type of patient that is not amenable to an ultimate high-type dental practice. Association with an established practitioner who has a good fee schedule certainly can be a stimulating factor in helping upgrade the fees of the young man. In fact, in many practices where there is an association, a contract is drawn which states that the associate must render a fee for the service exactly, as nearly as can be determined, the same as the senior man in the office.

10. Healthy competition. A very definite advantage, valuable to both parties, is a healthy competitive situation. It is only human nature, and not peculiar to dentists, that if a practitioner believes another dentist whom he knows will see the work he has done, he will attempt to do better. This type of stimulation is healthy for the men and office involved, and helps upgrade the profession.

Disadvantages • There are a few disadvantages that are impossible to overlook in considering becoming an associate.

1. Not being his own boss. It is true that most men can adapt themselves readily to new surroundings but there are those who resent guidance even when given with the greatest of finesse. Such men would never be adaptable to an association and it would be wise not even to make the attempt.

2. Patients' insistence on the services of the senior member. This insistence is not at all uncommon and sometimes may have to be complied with but, if handled properly, arrangements usually can be made with the mutual good will of all parties concerned. If the junior member is doing the same high-type dentistry as the senior member, the latter and his staff very nicely can promote to the patient the services of the other man and, in most instances, the patient will feel he is getting services as good as from the senior dentist.

3. Lack of a feeling of freedom. That the associate may not feel free to pursue his own technics and procedures can also be a factor worth reckoning with. Although many a young man has shown an older practitioner a technic of real value, just how far he should pursue his own ideas is a question that must be settled, and a thorough understanding should be reached before the association actually begins. It is a well-known fact that no two dentists operate exactly alike. Each has his own pet ideas and technics, and if the associate can produce the type of dentistry the senior practitioner is producing, without a waste of time and provided it does not necessitate extra laboratory or other auxiliary personnel, he should be allowed to use those methods from which he obtains the best results. If he is eager to do better work and has learned to adapt himself to his new surroundings, his interest in other technics of proven worth soon will be stimulated.

4. Little or no choice in office design or physical equipment. Again the ready adaptability of the associate will be an important factor. He can use the available setup as a proving ground for time and motion studies and, when he is ready to design his own office, can correct the things he felt were a mistake in the office where he was associated. It is the wise young man who will "go along" but tabulate for future use those things that can be improved on.

5. Lack of complete control of treatment and fees. This is another question that should be settled before an associate practice begins. It is often wise, and good not only for the entire practice but the younger man as well, that the senior dentist keep in close touch with the type of treatment rendered and, certainly, the fee schedule of the associate. It is true that some men will resent this, and may even consider it "meddling," but that will depend to a great extent on the adaptability of the associate and the understanding gained in advance.

6. Possibility of temperament disharmony and personality problems consti-

tute the greatest hazard of all the disadvantages to be considered. Development of this thought will be given later.

7. Risk of professional prestige. If an associate unknowingly establishes himself with a practitioner whose standards of dentistry are not of the highest, his reputation can be badly damaged. It would seem wise for the prospective associate to investigate the established practitioner as thoroughly as he himself expects to be investigated.

ASSOCIATION FROM VIEWPOINT OF SENIOR DENTIST

The foregoing discussion has been a thorough examination of the advantages and disadvantages from the standpoint of the prospective associate. The following observations will deal with the established dentist who is contemplating having an associate.

Number one among the advantages, and probably the greatest, is that an associate may help take a work load off the dentist's shoulders. If a man has a great backlog of work to be done and a long list of waiting patients, it would seem advisable to employ an associate. This associate can help dissipate this backlog and re-establish the existing practice on a current basis. It should be remembered, however, that if the associate is an affable individual and a skillful operator, he soon will establish his own practice to the extent where he no longer can help take the burden off the operator.

Another distinct advantage is that if the dentist wishes to have time away from the office, the associate and hygienist can keep on working, thus adding continued income to the office in spite of the senior member's absence. It is also comforting to know that if one of his own patients has an emergency arise, proper treatment can and will be rendered in his own office. This would be impossible if there was not an associate.

A questionable advantage is increased income for the senior member. At this point it might be well to state that the Internal Revenue Department rules that an associate must be classified as an employee and his entire gross income handled exactly as though it were the dentist's own. This of course puts the senior dentist into a higher tax bracket. To be considered is how productive is the associate. If he becomes extremely productive, which most cannot do in less than three or four years, his productivity can offset the tax loss enough that some profit is made. Also to be considered is the investment necessary in equipment and space, and the dentist must plan to amortize this over the number of years he expects to have an associate. The cost of added personnel must be considered also in the question of profit, as it can be agreed that it is entirely possible for an associate to be an unprofitable or profitable undertaking.

Added prestige is an advantage in the employment of an associate. It is only human nature to believe that if a dentist is so good his practice demands an associate, he must be well above the average as a dentist and, generally, this is true.

Now to evaluate some disadvantages from the standpoint of gaining an associate. Earlier in this paper mentioned as a disadvantage to the prospective associate was a clash of personalities and temperament, and most assuredly this can be a great hazard to both parties concerned. Wholeheartedly recommended are two things that might overcome such a possibility: (1) a definite clause in the written agreement that the existing relationship can be broken by either party on 30 days' notice (an association is of no real value anyhow if one or both parties are unhappy or incompatible), and (2) a trial period, agreeable to both parties, for a minimum of 90 days. After this length of time it usually can be determined if the proposed relationship will be compatible and pleasant.

Another hazard to be reckoned with is

that the new man in the office may not follow guidance and readily adapt himself to the established routine. Those dentists who have practiced a number of years have established a routine and an office policy. It is necessary that the associate lend himself to these policies. Most dentists know, by trial and error, what policies and technics work best for them, and to maintain harmony the associate must follow the practitioner's guidance.

Disagreement because of failure to have reached a complete understanding on financial arrangements, philosophy of practice, responsibilities, and conduct of office before beginning the association can be a pitfall of no small importance. Even though many people say a contract is not worth the paper it is written on, the author cannot urge all concerned too strongly to have a very definite contract drawn up by a competent lawyer before the association is begun. It gives a certain psychological advantage, as well as being a legal instrument to break or terminate an association without any financial liability. The author also strongly urges that the dentist acquiring an associate have lengthy talks with the prospect concerning his philosophy of practice, responsibilities, and so forth. To sum up this hazard quickly, let no dentist contemplate or propound an association without benefit of a written agreement.

The inability of the associate to produce the proper quality of dentistry can be a problem indeed, and one of an exasperating nature. Here again a 90 day probationary period can prove an invaluable move. It takes valuable chair-time periodically to watch the associate work and to inspect his finished product but it is definitely worth it. If the practitioner should find himself in the unenviable circumstance where the associate needs to be worked with after office hours, the latter should be urged strongly to do postgraduate study and work. Should the associate not be amenable to this suggestion, the relationship should be terminated quickly.

It is to be expected that the ability of the new graduates to work with speed is slight. The practitioner should be patient with these men and urge accuracy first and then the acquiring of speed. It should be remembered that senior dentists are helping to mold and influence the entire careers of the new graduates. It is easy to become disgusted with the inabilities of these people, but it should be remembered that patience many times pays. The established dentist also should reflect on his own shortcomings when he graduated from dental school.

Friction caused by auxiliary personnel always is likely when a new man comes into the practice. It is just as essential to have a good understanding with all the staff members in advance as with the prospective associate himself. It should be thoroughly understood by all the staff that if any person causes friction, after a fair chance his or her resignation will be requested.

The final hazard that will be discussed in this paper is the question of added personnel. There are men who are natural personnel directors, but for those who are not, every member added to his staff increases his problems. It is inconceivable for this essayist to fathom why the addition of personnel, whether it be only one or more, should be a deterring factor in the growth of a practice. It is true that the greater the number of personnel, the greater the chances are for petty jealousies, dislikes, and friction of many types. It is felt that a definite office policy regarding employees, a thorough understanding in advance, regular staff meetings, and a preference given to the hiring of more mature women can greatly alleviate and probably forestall undesirable situations completely.

Now comes the ever important question: what is an equitable financial arrangement and how is it determined. An equitable financial arrangement is one

that is of benefit to both parties. It must provide sufficient income for the associate and be profitable for the established dentist. The associate, and especially the new graduate, should recognize that his capacity to produce dental work is limited and, in the early stages of his relationship, his financial gain is therefore limited. It is entirely possible that in the early months of an association it will not be profitable. Naturally as he becomes more productive, his remuneration should increase. In time he should be allowed to participate in the added income of the office. This is only a fair return for his services, and usually will be an incentive to do better dentistry and achieve greater production.

There are several financial arrangements that might be utilized where the state dental practice laws permit. They are:

1. A straight salary, which can be paid on a monthly or yearly basis. This is not a good arrangement, especially from the standpoint of the associate himself.

2. A straight percentage. This is based usually on the cash gross receipts, not from fees rendered.

3. A salary and a percentage. For instance, the young dentist could be guaranteed a $100 per week salary up to a gross receipt of $5,700 per year. As his gross receipts increase over that amount, then these receipts should be considered in determining his percentage. As his yearly gross continues to increase, so could his percentage of all over his yearly guarantee increase. The author personally favors the latter plan as it is the most equitable to both parties concerned; however, the choice actually depends on the individuals involved and the specific practice in question.

The final consideration will be how long the association should be maintained. Ideally, a permanent arrangement should be planned, but few people feel free to commit themselves to such an agreement. The author feels firmly that a minimum of five years is necessary in order for both parties to gain maximum benefit. It must be remembered, however, that there is no advantage in having a dissatisfied associate, and he will do the practice no good if he is held by a binding time agreement against his will. Likewise, when the established dentist finds the association inharmonious and unsatisfactory, the agreement should be terminated. The advisability of a 30 day termination clause in the contract was mentioned earlier.

COMMENT

An attempt has been made in this paper to present the subject of an association from all aspects. It is hoped that any dentist contemplating such an arrangement will evaluate his problems, personality and practice. If all these aspects are thoroughly studied in advance, the chances of a pleasant, productive and profitable relationship certainly will be enhanced.

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Scientists in Fact and Fiction • In contrast to the scientist usually represented by newspapers and science fiction writers, true scientists perceive that the facts still not known appear somehow to increase geometrically in comparison with facts already discovered and evaluated by scientific research and knowledge. *Gardner Murphy, In the Minds of Men, 1953.*

The professional success standards of Alabama dentists

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A study designed to answer questions related to dentistry and dental education was conducted early in 1955 at the University of Alabama School of Dentistry with the support of a national foundation[1] and the cooperation of the Alabama dentists. A portion of this survey was made using a form entitled "A Survey to Determine Professional Success Standards." The entire questionnaire and the raw scores obtained have already been published, together with a description of the method of sampling.[2] It is the purpose of this paper to interpret the data secured through that part of the survey which dealt with success standards.

Some explanation of the method of sampling is necessary. This portion of the questionnaire was sent to approximately one out of six white dentists in Alabama and to all Negro dentists. Had Negro dentists been selected for inclusion by the same sampling technic used for white dentists, there would have been little assurance that their opinions would have been represented at all, because of the relatively small number of Negroes who practice dentistry in Alabama. Therefore, the total Negro group was polled to assure adequate representation of this segment of the population. Because of the difference in the percentage of persons surveyed in the two racial groups, the data had to be recorded separately. All Negroes therefore have been excluded from the present report, except that a supplementary comment is made about areas in which there is a statistically significant difference between the reactions of the white and Negro dentists.

An analysis of the questionnaire results indicates that the dentists seem to agree on their standards for success. A few statistically significant differences were found between the Negro and white groups, the rural and urban groups, and between dentists who had graduated before and after 1940. However, the number of such differences was small compared with the number of items about which there was agreement. It seems reasonable, on the basis of these findings, to hypothesize that there exists within the dental profession in Alabama a generally accepted code of values which can serve as a frame of reference for evaluating the professional success of the individual dentist. The study reported is a test of this hypothesis and also an attempt to measure the components of this code.

The results of the survey questionnaire

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1. W. K. Kellogg Foundation, Battle Creek, Mich.
2. Wuehrmann, A. H. Alabama dentist responds. Bul. Alabama D. A. 40:3 Jan. 1956.

were analyzed by a technic commonly used in the social sciences, the method of successive intervals,[3] two aspects of which are of interest to this study; (1) a test of unidimensionality, that is, a test of whether it is reasonable to assume that a single set of values underlies the responses of a group of subjects to all items on a questionnaire, and (2) a technic of scaling items whereby numbers can be assigned to the differences between items in such a way as to reveal the relative contribution of each item to the code of values. Both of these aspects of the method of successive intervals involved rather complicated statistical concepts which will not be discussed here, but the statistical criteria of unidimensionality were satisfied and the conclusion was reached that a single code of values relative to standards of professional success is adequately descriptive of Alabama white dentists.

There are several levels of measurement employed in both the natural and social sciences. The numbers assigned to questionnaire items by the method of successive intervals constitute measurement at the level of an interval scale.[4] This type of measurement is used on the Fahrenheit or centigrade thermometers. There are two prominent features of this type of measurement: (1) a constant unit of measurement, and (2) an arbitrary origin. In the case of temperature measurements, it cannot be said that a body at 40° is twice as hot as one at 20°. Similarly, a scale value of 40 derived from successive intervals is not twice as important or twice as much as one of 20. In regard to temperature it can be said that the interval between a reading of 40 and 20 is the same as the interval between 60 and 40. This is the type of interpretation appropriate also to the scale of values resulting from an application of the method of successive intervals.[5]

The items of the questionnaire relating to success standards are reproduced in the table along with their scale values as determined by successive intervals. The dentists were asked to indicate the degree to which they agreed with each item. Judgments of the degree of agreement constitute the data from which the scale values were determined. The relative size of the interval between scale values also is given. In the list of items a low scale value indicates a low average degree of agreement and a high value indicates a high average degree of agreement. The origin of the scale (scale value 0.00) was assigned arbitrarily to the item having the lowest average agreement. This should not be construed, however, as meaning that there existed no agreement whatever.

DISCUSSION OF RESULTS

Although the reader undoubtedly will draw his own inferences from the scale as presented, the following conclusions appear to be valid. In general, in order to be successful in dentistry, an individual must have the ability to get along with people and must derive a considerable personal satisfaction from his professional activities (items 28 and 29). These factors greatly outweighed all other items in relative importance. Interestingly, the dentists of Alabama feel that the greater the amount of applicable knowledge in the basic science aspects of dentistry, the greater the likelihood of success (item 27). However, the key word in this phraseology seems to be "applicable," since the Alabama dentist does not feel that a high degree of interest in the theoretical concepts of the basic sciences contributes materially to success (item 7). Also of considerable interest is the fact that the dentists seem to feel that a high degree of skill in the manual technics of

3. Guilford, J. P. Psychometric methods, ed. 2. New York, McGraw-Hill Book Co., 1954, pp. 223-224.

4. Stevens, S. S. On the theory of scales of measurement. Science 103:677 June 7, 1946.

5. Guilford, J. P. Psychometric methods, ed. 2. New York, McGraw-Hill Book Co., 1954, p. 259.

Table • The success scale. Items are arranged in increasing order of agreement by Alabama dentists

Item number	Item	Scale value	Relative size of interval between scale values
1	Seeking prominence in professional affairs contributes significantly to becoming a successful dentist.	0.00	
			42
2	The more there is in common between a dentist and his patients, the more likely is the dentist to succeed.	.42	
			3
3	Seeking prominence in community affairs contributes significantly to becoming a successful dentist.	.45	
			12
4	The successful dentist is likely to be the one who donates a significant amount of professional service to charity cases.	.57	
			5
5	A crucial determinant of a dentist's success is the kind of neighborhood in which he locates his home.	.62	
			15
6	Motivation to achieve high financial reward is a characteristic of the successful dentist.	.77	
			6
7	The successful dentist is likely to have a high degree of interest in the theoretical concepts of the basic sciences.	.83	
			6
8	The type of person the dentist marries is reflected in his level of success.	.89	
			3
9	Success is not likely to come to one who has little awareness of his friends' opinion of him as a dentist.	.92	
			2
10	To a large extent a dentist's success depends upon his awareness of what the people in the community think of him.	.94	
			3
11	The degree to which a dentist's friends respect him as a successful dentist is *in fact* a major determinant of his success.	.97	
			9
12	A very important element in the success of a dentist is the amount of respect which his friends have for the dental profession.	1.06	
			1
13	Membership in social clubs and civic organizations greatly facilitates success in dentistry.	1.07	
			1
14	The successful dentist is likely to have a great degree of skill in the manual technics of dentistry.	1.08	
			1
15	The greater the insight of a dentist into the opinions fellow dentists have of him, the more likely he is to be a success.	1.09	
			6
16	The successful dentist is one who is apt to have a great amount of concern for community health standards.	1.15	
			1
17	The greater the insight of a dentist into his patients' opinions of him, the more likely he is to be a success.	1.16	
			1
18	Very important in determining the success of a dentist is the way people of the community evaluate him with respect to other dentists.	1.17	
			2
19	The degree to which a dentist's patients consider him superior to other dentists significantly influences his success.	1.19	
			4

(Continued)

20	The attitudes of a given dentist's clientele toward the dental profession greatly affect his success as a dentist.	1.23	7
21	The higher the standing of the dental profession among other professions in the community, the more likely is a particular dentist to enjoy success.	1.30	3
22	The greater the enjoyment of immediate family life, the greater the likelihood of success in dentistry.	1.33	12
23	One of the most important determinants of dental success is the achieving of the esteem of dental colleagues.	1.45	7
24	An individual dentist is successful to the degree that he is highly regarded by people in other professions.	1.52	3
25	The greater the dentist's ability to assume his social position or "place" in the community, the more probable is his success in dentistry.	1.55	2
26	The locale of his practice largely determines a dentist's success.	1.57	13
27	The greater the amount of applicable knowledge in the basic science aspects of dentistry, the more likely one is to be a successful dentist.	1.70	
28	The successful dentist is likely to be highly skilled in getting along with people.	*	
29	The successful dentist is one who tends to derive great personal satisfaction from being a dentist.	*	

*Scale values for items 28 and 29 are indeterminate by the method of successive intervals because of the very large proportion of the sample who expressed maximum agreement with them. The true values for these items are thus known to be above the other twenty-seven items, even though it is not possible to determine how far above.

dentistry contributes considerably less to their success than do many other factors (item 14).

As the items are scanned further in a reverse order, it becomes obvious that the locale of a man's practice, his social position in the community, and the degree to which he is highly regarded by people in professions other than dentistry are of paramount importance to his success in dentistry (items 24, 25 and 26). It also becomes apparent that dentists consider success to be directly related to the degree of enjoyment of their immediate family life (item 22). Continuing in the reverse order, item 23 suggests that the esteem in which the practitioner is held by his dental colleagues is of importance, although the degree of insight that the dentist has into his fellow dentists' opinions of him is relatively unimportant (item 15). The standing of the dental profession among the other professions is felt to contribute moderately to the success of all dentists (item 21) and, as might be expected, item 20 supports the concepts of item 21 since it implies that the attitudes of the dentist's clientele toward the dental profession affect the success of the individual dentist.

Strangely, the dentists of Alabama seem to feel that the degree to which the individual dentist's patients consider him superior to other dentists and the amount of insight the dentist has into his patients' opinion of him (items 17, 18 and 19) contribute less to his success than the factors which have been discussed previously. Perhaps inconsistently, the dentists have suggested that the success of the individual dentist depends only slightly on what the people in the community think of him (item 10). The phraseology used in formulating this

statement (item 10) was designed, and apparently was interpreted by the dentists, to mean what the people in the community think of the dentist as an individual rather than as a technically capable professional person. Thus, the dentists of Alabama seem to be of the opinion that the dentist's personal life and attributes contribute less to his success as a dentist than do the opinions which the people in the community hold about him as a practicing dentist.

Although the success of a dentist is at least moderately related to his degree of concern for community health standards (item 16), the degree to which the dentist personally contributes his time and effort to the improvement of these health standards seems to be related only insignificantly to success (item 4). The role which the dentist's friends play in his success pattern seems to be far less important than many other factors. This is borne out in item 2, in which a common bond is mentioned, and in items 9, 11 and 12, in which are mentioned specifically the reactions of the dentist's friends.

Although the dentists of Alabama apparently feel strongly that the locale of their practice plays a major role in their success (item 26), they apparently do not feel that either the type of person the dentist marries or the location of his home is a crucial determinant of success (items 5 and 8). Although membership in social clubs and civic organizations seems to be of some importance to the success of the dentist (item 13), reference to items 1 and 3 emphasizes that the dentist feels his success to be almost unrelated to his seeking prominence in professional or community affairs. Lastly, and to the credit of the Alabama dentists, they do not measure their degree of success by their motivation for achieving high financial reward (item 6).

The only statistically significant difference found between the sample of white dentists and the total population of Negro dentists concerns the relation between an interest in the theoretical concepts of the basic sciences and success in dentistry (item 7). The Negro group considers such interest more important than does the white group. Had the Negro group been included in the sample on which the scaling was done, this aspect of the success code would probably have received a higher scale value than the 0.83 which was assigned to it.

The scale values reported represent averages for the white sample. Within this white sample, several statistically significant differences in the degree of agreement with the items were found between dentists who had graduated before and after 1940, and between dentists who practiced in large and small towns. Those dentists entering practice before 1940 demonstrated a tendency to agree more strongly with the following items: (4) the successful dentist is likely to be the one who donates a significant amount of professional service to charity cases; (5) a crucial determinant of the dentist's success is the kind of neighborhood in which he locates his home; (12) a very important element in the success of a dentist is the amount of respect which his friends have for the dental profession; and (2) the more there is in common between the dentist and his patients, the more likely is the dentist to succeed. To rephrase this briefly, the older dentist places more emphasis than does his younger colleague on his friends' opinions, on the neighborhood in which his home is located, and on the degree to which he contributes to the care of the needy.

Other differences were found between dentists who practice in towns smaller than 25,000 and those who practice in urban areas. The group practicing in the smaller towns expressed stronger agreement with the following items: (16) the successful dentist is one who is apt to have a great amount of concern for community health standards, (5) a crucial determinant of a dentist's success is the kind of neighborhood in which he locates his

home, (25) the greater the dentist's ability to assume his social position or "place" in the community, the more probable is his success in dentistry and (15) the greater the insight of the dentist into the opinions fellow dentists have of him, the more likely is he to be a success. To rephrase this, the rural dentist seems to be more concerned about community health standards than is the urban dentist. He feels that his place in the community and the opinions which his fellow dentists hold about him contribute to his success more than these same factors contribute to the success of the urban dentist. Although an item-for-item correlation does not exist, the rural dentists and older dentists seem rather closely allied philosophically on the items in which differences exist; likewise, the younger dentists' ideas seem to correspond with those of the urban dentists. It is quite possible that the younger dentists are settling in the urban areas. If so, this would explain the agreement between these groups.

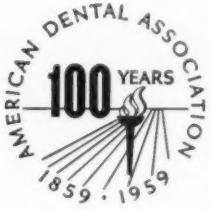
SUMMARY AND CONCLUSIONS

All Negro dentists and a random sampling of the white dentists in Alabama were sent a questionnaire related to standards of professional success. The results of this survey have been analyzed by the method of successive intervals. This analysis suggests that the professional success code maintained by Alabama white dentists is sufficiently homogeneous to describe it in terms of a single set of scale values which reflect the relative importance of each particular item in the over-all code. Several statistically significant differences in response to some of the items were found among certain minority groups. These differences do not invalidate the scale values obtained by the method of successive intervals. The fact that only one difference was found between Negro and white dentists indicates that the scale values reported here are also representative of the Negro group with the exception of the one item.

A consideration of the high and low scale values suggests that the successful dentist is likely to be highly skilled in getting along with people and that he tends to derive great personal satisfaction from being a dentist. To a lesser degree the esteem of his colleagues and people in other professions, his social position, and the locale of his practice are strong determinants of his success. The dentist does not feel that success is related primarily to financial reward. Unfortunately, he seems to feel that there is little correlation between his success and his motivation to accept responsibility in professional and community affairs or in his willingness to donate significant amounts of professional time and service to the care of the indigent. If it may be assumed that all dentists desire success, a conclusion can be drawn that most dentists are uninterested in these three areas just mentioned; namely, professional affairs, community affairs and the care of the indigent. This fact should provoke considerable self-analysis, since in today's socioeconomic order, it has come to be realized that the indigent will be cared for, either on a private or governmental basis. Additionally, if professional and community affairs are not handled by the educated, thoughtful segment of society, they may be mishandled by those less qualified for these civic and professional responsibilities.

editorials

One hundred years of service



Nineteen hundred and fifty-nine marks a major milestone in the history of the American Dental Association. One hundred years have elapsed since twenty-six dedicated dentists, meeting at Niagara Falls, founded a national organization which has grown to a membership of more than 91,000 representing nine-tenths of the dentists in the United States—an Association formed "to encourage the improvement of the health of the public and to promote the art and science of dentistry." How well the Association has lived up to that objective during its first century of service is left to the world to judge.

Beginning in February, when the year-long centennial observance will be opened formally during the Chicago Dental Society Midwinter Meeting, state and local dental societies will hold special programs commemorating the historic occasion. Those meetings will be climaxed by a five-day centennial session of the Association to be held in New York City September 14 to 18, at which time hundreds of dental visitors from beyond the borders of the United States—members of the Fédération Dentaire Internationale and others—will participate.

Those who are privileged to hold membership in the Association can be justly proud of its growth and development, not only in material resources but in the influence it exerts and the respect it enjoys in local, state and national health circles. Those who are privileged to practice today should be proud of their great heritage and of those who made it great—those hundreds of dentists and others who, during the Association's first one hundred years contributed in a hundred different ways to raise the profession to heights undreamed of by the twenty-six founders of the Association.

Every American dentist recognizes the names and the contributions of the great men in the profession's past—such men as Hayden and Harris and Hullihen; Wells and Morton and Miller; Black and White and Brown. Fitting it is indeed that they be memorialized during the course of the coming year. So, too, should countless others whose contributions, although less dramatic, were most important. Every

dental society has had many unsung members on its rolls who dedicated their lives to dentistry—general practitioners, specialists, teachers and community workers whose collective efforts have helped raise the standards of dentistry to their present level.

It is hoped that dental societies, in commemorating the Association's centennial, will not place all their wreaths on the brows of the mighty—that a few flowers be laid at the feet of those who, over the years, toiled unceasingly—even if less brilliantly—to bring credit to the Association and to the profession which it serves. This great nineteen fifty-nine centennial is too big to neglect the small.

Radiation protection

The statements of the extremist regarding the dangers attributed to the taking of dental roentgenograms are gradually becoming less violent. Evidence continues to mount that when good equipment and good judgment are used, the hazards of dental roentgenography are reduced well below acceptable limits.

For the benefit of dentists, physicians and others concerned, the National Committee on Radiation Protection has formulated, and issued in handbook form, a list of radiation protection recommendations which it revises and updates from time to time. Comments by Robert J. Nelsen relating to the latest revision of the National Committee on Radiation Protection Handbooks are published on page 118 of this issue. Every dentist who uses x-ray equipment in his practice should be thoroughly conversant with them.

Although the problems of x-ray protection in the dental office are much simpler than in other areas of radiation usage, dentistry is not unmindful of its responsibilities in this field. THE JOURNAL has published numerous articles calling the attention of the practitioner to the methods which can be used to reduce the amount of radiation applied in dental diagnosis. Both the Council on Dental Research and the Council on Scientific Session have furnished information and suggestions to the dentist which, when followed, will assure him that he is in line with the ". . . long standing philosophy of the National Committee on Radiation Protection that radiation exposures from whatever source should be as low as practical."

Dr. Nelsen points out two pertinent items in the latest comments of the National Committee on Radiation Protection. (1) "The changes in the accumulated MPD [maximum permissible dose] are not the result of positive evidence of damage due to use of the earlier permissible dose levels, but rather are based on the desire to bring the MPD into accord with the trends of scientific opinion." (2) "Radiation exposures resulting from necessary medical and dental procedures need not be included in the determination of the radiation exposure status of the person concerned." The first of these comments states very simply that the recent changes in maximum permissible dose are made on the basis of opinion rather than on evidence. The second means that the dental practitioner can dispel any concern by radiation

workers, and others, about themselves and their family regarding any exposure which they would undergo from dental roentgenographic examinations. The dentist can do this by quoting the National Committee on Radiation Protection.

The dental profession acknowledges the well-considered guidance afforded it by the National Committee on Radiation Protection. It recognizes its joint responsibilities with the other health professions in making full use of the advantages of roentgenographic aids in diagnosis while at the same time endorsing the National Committee on Radiation Protection philosophy of keeping all exposures as low as practical.

The effectiveness with which the profession meets this responsibility depends entirely on the extent to which the National Committee on Radiation Protection recommendations are implemented in each dental office by the individual practitioner.

Independent Dental Laboratory Association continues to press for "public denturist" legislation

Apparently the report "Tasmanian Denturist Act lauded by laboratory group here," published on page 896 of the December issue of THE JOURNAL shocked many readers, which was exactly the reaction it was intended to produce. Too few dentists realize that there is a small but determined group of dental laboratory technicians, self-styled "public denturists," intent on securing legislation which would permit untrained and, therefore, unqualified persons to render dental service directly to the public.

In Illinois the "public denturists" have incorporated the Independent Dental Laboratories Association. This organization, which was the object of a report of the Council on Dental Trade and Laboratory Relations (J.A.D.A. May 1958, p. 738), should not be confused with the National Association of Dental Laboratories, a highly ethical organization, the members of which are as opposed to the policies of the Independent Dental Laboratories Association as are the ethical dentists themselves.

As further evidence of the intentions and activities of the I.D.L.A., this month's issue of THE JOURNAL (page 120) publishes a statement which that organization presented to the Illinois Medical Practice Act Commission last September. Every dentist concerned with the welfare of his patients and the integrity of his profession should read this statement and be forewarned of its potentials.

All but four of the state legislatures will convene in general session in 1959, and there is a likelihood that several states may be faced with legislative proposals similar to those proposed by the I.D.L.A. in Illinois. Every constituent dental society, therefore, must be doubly watchful this year of the introduction and progress of bills that might undermine dental practice acts and otherwise adversely affect the dental health of the community.

Once more every dentist is urged to read and reread the articles on page 896 of the December 1958 issue of THE JOURNAL and on page 120 of this issue as they set forth in no misunderstandable style, the objects and interests of the self-styled "public denturist." Once these objects and arguments are understood, few dentists will have difficulty in refuting them.

The Science Fair program and dental recruitment

The attention centered today on science by the development of man-made satellites, nuclear power and other technological "breakthroughs" has raised a recruitment problem for dentistry. Applications for enrollment in dental schools have fallen off in the past two years. Dental research problems that were started or expanded in 1956 are hampered by a growing shortage of investigators trained in dental science. Qualified dental educators are becoming scarce.

If a dental manpower shortage is to be avoided a few years hence, the profession must now intensify its recruitment efforts. Competition is keen among industrial, military and related institutions for our best youth. High school youngsters are being encouraged from many sources to embrace careers in industrial chemistry, physics and engineering. Dentistry must step up its program to encourage more young men and women to enter its ranks, for dentistry is obligated to provide better dental health service for our expanding population. The importance of dentistry must be brought forcefully to the attention of the public, and particularly to the attention of youth.

Every member of the American Dental Association should welcome the opportunity offered by the Science Fair movement to proclaim dentistry's story. Many dentists already are working with America's youth, and report they are deriving a satisfying reward from the personal and community relations thereby established. Science Fair committees are being set up by many state and local dental societies. See that such a committee is set up by your society, and volunteer to join it.

A new booklet, *Dental Projects for High School Science Students,* is available from Science Service (see page 114 of this issue). The booklet tells how to create more than a dozen dental science exhibits, and presents suggestions for many others.

When your high school patient or his science teacher asks for your guidance on a dental science project, be prepared for a stimulating experience. Still better, don't wait to be called on, but seek out this adventure by making the first approach to the science department of the high school in your community. You owe it to your community, your profession and yourself.

A little effort today to place dentistry squarely in the forefront of the Science Fair movement will pay rich dividends for the future. Such effort will assure the recruitment of future dental practitioners, researchers and educators, and the good public relations this will bring to dentistry will help solve many other professional problems.

news of dentistry

Additional news of 99th Annual Session; state officers to forego 1959 meeting

Operations of the American Dental Association relief program, the interest of the state dental society in financial assistance for dental students, and the role of the state society in developing hospital dental service were discussed by the 39th Conference of State Society Officers, November 9, in the Statler Hilton Hotel, Dallas, Texas, held in connection with the annual session of the American Dental Association. The conference will not be held in 1959, to free state society officials for participation in the Centennial observation, but will be resumed in 1960, it was announced.

Harold E. Tingley, Boston, secretary of the Massachusetts Dental Society, conference president, presided. Wayne H. Speer, Houston, president of the Texas Dental Association, welcomed visitors to the conference.

Louis M. Cruttenden, assistant secretary, American Dental Association, described how the Association's relief program operates. "There will still be an important need for the Relief Fund, to care for those not eligible for O.A.S.I. or for those who need supplemental relief," said Dr. Cruttenden. "O.A.S.I. will not fill the need met by the Relief Fund. O.A.S.I. funds will be helpful but not adequate. The Relief Fund must continue to serve in its small capacity, in good times and bad."

In 1958 there were 126 recipients of aid from the Relief Fund, said the speaker. Representatives of several states described methods by which they had succeeded in building state relief funds. In Rhode Island, each member is assessed two dollars a year.

Means by which state societies could render financial aid to dental students were discussed by Maynard K. Hine, dean of the Indiana University School of Dentistry and president of the Fund for Dental Education, and Gerald D. Timmons, dean of Temple University School of Dentistry.

State dental societies, said Dean Hine, can assist dental students by: (1) making contributions to dental schools or to the Fund for Dental Education, which contributions can be used for student loans and scholarships, for teacher training programs, and so forth, and (2) organizing a dental education committee to study ways of interesting dental students in

organized dentistry. "Student participation in dental society affairs should be encouraged."

The Fund for Dental Education has been organized with the sanction of the American Association of Dental Schools and the Council on Dental Education of the American Dental Association, said Dean Hine. "More than $75,000 already has been given to the Fund, although no active solicitation program has been started. Most of the contributions to date have come from corporations which are members of the American Dental Trade Association as well as in the form of a grant from that organization. . . . The Fund has now employed a full-time executive secretary, G. Willard King, whose permanent offices will be in the building of the American Hospital Association at 840 North Lake Shore Drive, Chicago. Already money has been given to the Fund specifically to support two scholarships for graduate dentists who desire to teach, and a committee of the Fund is selecting the recipients."

Dean Timmons said that relief to dental students should be based on need. "In the past several years, every dental school in the United States has been filled to capacity," he said. "This indicates that enough people have money to finance a dental education, to fill all spots. We may have taken students less qualified than other students who could not afford a dental education."

Dean Timmons said that the quality of applicants for dental schools "is below the quality we used to receive. All dental schools are in a competitive market today because of the glamor of engineering, of sputniks and missiles. . . . Students with high qualifications but without funds should receive assistance so that they can go on with their education."

The average tuition in dental schools along the Eastern seaboard is $1,000 a year, whereas it used to be $250, said the speaker. "I am fearful that we are getting to the point where only the sons of the rich or well-to-do can afford dental schools."

He urged each state dental society to consider a "crash program" to raise funds that could be available for loans or scholarships to dental students. At Temple, every recipient of a grant had repaid it, said Dean Timmons. Dental students could be helped greatly by obtaining for them vacation jobs during the summer, he said.

HOSPITAL DENTAL SERVICE

The role of state societies in developing hospital dental service was discussed by Gustav O. Kruger, Jr., professor of oral surgery, Georgetown University School of Dentistry; David Tanchester, chief of dental service, Montefiore Hospital, New York City, and Bernard J. Conway, secretary of the Association's Council on Legislation.

"Someone has said that the hospital of today is the health supermarket of the community," said Dr. Kruger. "The complexities of modern medicine, together with widely used insurance and health plans, take more and more practice out of the medical office and into the hospital. . . . The use of hospitals for dental services has received impetus from health insurance plans, and union health and welfare programs, which now pay for special dental services performed in hospitals. . . . Dentistry has an important role in the total health care of the patient who comes to the hospital, whether he enter primarily for medical or dental reasons, whether he be an inpatient or outpatient, private or indigent."

The state dental society has five functions in furthering the role of dentistry in the hospital, concluded Dr. Kruger. The five functions are: inspection of hospitals; guidance to dentists interested in establishing or improving hospital service; education of local dental and medical practitioners and of hospital administrators and trustees, and education of the

dentist in hospital procedures; stimulation of interest in hospital dentistry, and arbitration of questions relating to the scope of hospital dental procedures.

Dr. Tanchester said that hospital dental service had four main functions—administrative, advisory, clinical and educational. The hospital of tomorrow holds out the promise of better health for patients, he said.

Mr. Conway said that the dentist who practices in hospitals should understand his legal rights and responsibilities. The typical hospital is not legally responsible for the actions of practicing surgeons, physicians and dentists, he said. The dentist who practices in a hospital is bound by the hospital's regulations when he is practicing there, said the speaker, adding: "A hospital will never insulate a dentist from his responsibilities while he practices there, but may enlarge his responsibilities."

STATE SOCIETIES AND THE CENTENNIAL

The American Dental Association has five objectives in its Centennial Celebration, Peter C. Goulding, secretary of the Centennial staff committee, told the conference. The objectives are:

1. To direct the attention of the American public to the current status of dentistry as a health profession and to the progress made in the last century by the Association.
2. To renew the interest of members and of the constituent and component dental societies in the present and future programs of the Association.
3. To provide during the Centennial year enlarged opportunities for special programs of dental health education in the communities.
4. To give evidence, largely through the scientific program of the Centennial Session, of the continued international leadership of American dentistry.
5. To interest American leaders and the American public in recognizing the needs and resources of the American dental profession and in the profession's contribution to health and the national way of life.

State and local dental societies were urged to begin considering such Centennial projects as a Centennial civic luncheon on February 9, 1959; a Centennial banquet during the state or local annual meeting; a Centennial issue of the society's journal; Centennial participation in science fair programs; Centennial participation in career programs; the use of metered mail Centennial salutes; public exhibits and dental health contests, and Centennial awards to individuals in each state who have made outstanding contributions to dentistry.

ADDRESS BY PHILLIPS

President-elect Percy T. Phillips addressed the conference luncheon on the subject "Skullduggery at the Top of the Stairs." The question of dental service in hospitals was foremost among the problems facing dentistry today, said Dr. Phillips. Society evaluates a health service by its ability to aid in the preservation of long life and of well-being during that longer life, he said. With this yardstick, society had conferred a very high position and great prestige on dentistry. With the exception of medicine, no other health service group had contributed as much to general health as had dentistry, he said.

"Dentistry and medicine are in the midst of momentous adjustment," the speaker concluded. "It must not be maladjustment. . . . In many areas prompt action has had to be taken by the dental profession to maintain its right by law to function within the framework of whatever new system momentarily evolves. . . . Abuses are bound to creep in if we allow any group to formulate dental care programs in or out of hospitals, without our guidance. In most instances, society knows what it wants but does not know

THE HOUSE OF DELEGATES

IN 1958 SESSION AT DALLAS

how to get it. Without our direction, society may not only harm us as a profession, but more important, may harm itself as well. . . .

"The American Dental Association should and must be granted proper representation at the highest administrative level which is the Joint Commission on Hospital Accreditation. The establishment by right, of proper professional and administrative relations for dentistry, will pave the way for proper professional and administrative integration of all dentistry in the hospital of the future. This is a must, for the hospital of tomorrow will be the preventive health center of the community. . . . Once concessions and compromises have been established as the pattern acceptable to the dental profession, those who think they own and control hospitals will seek and obtain further capitulations. If we enjoy good public relations with society, society will demand dentistry's participation in the hospital and grant it justifiable limited autonomy. If we fail, medicine will accede to our profession's admission on its terms, and that will make dentistry a subordinate health service."

CASSEL HEADS CONFERENCE

The nominating committee, headed by Charles A. Wilkie, New York, submitted a slate of officers; all were elected by acclamation. The new officers are: President, Carl V. E. Cassel, St. Paul, secretary, Minnesota State Dental Association; vice-president, Thomas D. Holder, Portland, secretary-treasurer, Oregon State Dental Association, and secretary, Alvin B. Coxwell, Jr., Louisville, secretary-treasurer, Kentucky Dental Association.

A SENATOR COMMENTS ON DENTAL HEALTH NEEDS

The House of Delegates on November 10 conferred the Association's highest honor —honorary membership—on Senator Lister Hill (D., Ala.) for his "dynamic leadership in bringing better health to more and more of the people of this country, particularly through the new knowledge gained by research."

Senator Lister Hill (D., Ala.), right, receives a certificate of honorary membership in the American Dental Association from outgoing president, W. R. Alstadt.

Senator Hill in his response praised the Association for a century of "unselfish and devoted and dedicated work in the cause of safeguarding and building the health of our people and the strength of our nation.

"You stand," he said, "at the threshold of your second century. . . . Of all medical problems, oral disease makes the greatest impact on the American people. Few persons escape it entirely, and it represents one sixth of the total cost of medical care—an annual expenditure of some 1.5 billion dollars."

When the National Institute of Dental Research is housed in its own building with its Dental Research Center, it will add to the dignity and prestige of dentistry, he said, adding: "Our dental re-

search specialists will be able to bring together and concentrate their resources and their energies—now dispersed in makeshift and inadequate facilities. They will be able to press ahead into new areas of basic as well as clinical research, tying in their work with biological and chemical and psychological research.

"Those of us familiar with the progress of the dental profession during the past half century cannot fail to be impressed with the evolution of dental practice," said Senator Hill. "In dentistry, as in other medical fields, there has been historic progress toward the concept of man as a single biological entity. The evolution of dental practice, in its relationship to the biological and other sciences, has come about chiefly through dental research. For research is the mind and the heart of dental progress, as it is of all medical progress. . . .

"Dental research today is concerned not only with the causes, control and treatment of dental caries and periodontal diseases, but also with a number of other diseases and malformations affecting the mouth and adjacent structures. These include cancer, cleft lip and palate, oral manifestations of systemic disease, and the influence of oral diseases on other organ systems of the body. . . .

"There are many problems and many challenges ahead. Even now, 60 per cent of our people do not avail themselves of regular dental treatment. A population growth of three million a year in the United States demands additional numbers of dentists, technicians and nurses. . . ."

Although these needs will be met in America, there remains the international challenge, concluded the speaker. "I have been impressed with the reports from men in the international health programs who have told me of this repeated experience—the one service that has meant most to the individual person receiving it, the most sought after, and the longest remembered, is the service provided by the all too occasional dentist on an international health team. . . . The individual who needs dental treatment, the man with an aching jaw—he will never forget the American dentist who relieved him of a real and pressing anguish. Millions of people in the underdeveloped areas are without access to any sort of dental care. We cannot provide treatment for these multitudes. We could not in the foreseeable future train sufficient of their own people to meet the need. But we can turn our thoughts to this need. We can provide the spur to effective action that will make use of this potential for international human relations, for building and strengthening our friendships with other nations in the titanic struggle against Communism. . . . Medical science as an instrument of foreign policy can build people-to-people friendships far stronger and more lasting than loans or grants of money, or the official pronouncements of any governments."

ASSOCIATED GROUPS

American College of Dentists at its 39th annual convocation ceremonies November 9 in the Baker Hotel installed Harold J. Noyes, Portland, dean of the University of Oregon Dental School, as president. Dean Noyes succeeds Thomas J. Hill, Brecksville, Ohio, chairman of the Association's Council on Dental Research.

Other officers elected were: president-elect, Donald W. Gullett, of Toronto, Ontario, Canada; vice-president, Ralph J. Bowman, New York City, and new members of the Board of Regents: Walter J. Pelton, Washington, D.C., and James H. Springsted, Louisville, Ky.

American Association of Dental Examiners at its 75th anniversary meeting November 7-8 in the Statler Hilton Hotel installed Richard F. Gilmore, Grand Junction, Colo., as president to succeed Arthur W. Kellner, Hollywood, Fla. Other officers chosen were: president-elect, Milton G. Walls, St. Paul, Minn.; first vice-president, Clarence G. Brooks, New London, Conn.; second vice-president, H. Arthur Zappe, Mineral Wells, Texas; third vice-president, D. Roy Grant, San Francisco, and secretary-treasurer, Clarence J. Schweikhardt.

American Society of Dentistry for Children at its meeting November 7-9 in the Adolphus Hotel elected Harold K. Addelston, New York City, as president to succeed Albert L. Anderson, San Diego. Other officers elected were: president-elect, William E. Brown, Ann Arbor, Mich.; vice-president, James H. Simmons, Fort Worth, Texas; secretary-treasurer, Ralph E. McDonald, Indianapolis, and elected to the executive council, Paul M. Weber, Englewood, N.J.

American Academy of the History of Dentistry at its meeting November 7 in the Baker Hotel initiated into membership 52 dentists from all parts of the country. The Academy is compiling material for exhibits depicting the development of dentistry in the past 100 years, for showing at the Centennial meeting of the American Dental Association in September in New York City.

Robert Thoburn, Daytona Beach, Fla., was installed as president to succeed C. Willard Camalier, Washington, D.C. Other officers chosen were: president-elect, Van B. Dalton, Cincinnati; vice-president, Harry B. McCarthy, Dallas, Texas; secretary-treasurer, Milton B. Asbell, Camden, N.J., and editor, George B. Denton, Chicago.

American Academy of Oral Roentgenology at its meeting November 7-8 in the White Plaza Hotel elected Gordon M. Fitzgerald, San Francisco, as president to succeed Rene Rochon, Detroit. Other officers elected were: president-elect, Harrison M. Berry, Philadelphia; vice-president, Donald Waggener, Lincoln, Neb.; secretary-treasurer, T. S. Grant, Millbrae, Calif., and elected to the executive council, Harry Spangenberg, Columbus, Ohio.

American Academy of Implant Dentures at its meeting November 7-9 in the White Plaza Hotel elected as president W. E. Pernell, Chandler, Ariz., to succeed Roy L. Bodine, Jr., Ft. Sam Houston, Texas. Other officers elected were: president-elect, Frank A. Strake, St. Louis; vice-president, William E. Barb, Indianapolis; secretary, A. Norman Cranin, Brooklyn; treasurer, Marshall Mueller, St. Paul, Minn., and executive council members: Robert H. Meibauer, New York City, and E. R. Hinrichs, Lincoln, Neb.

National Association of Seventh Day Adventist Dentists at a meeting November 7-9 in the Dallas Hotel elected as president Walter C. Dorn, Silver Springs, Md., to succeed John Bata, Jr., Hyattsville, Md. Others elected were: president-elect, Franklin C. Nelson, Pomona, Calif.; vice-president, Eldon E. Carmen, Marietta, Ga.; secretary-treasurer, Glenn H. Curtis, Loma Linda, Calif., and elected to the board of trustees, Robert Cole, Orlando, Fla.

American Dental Society of Anesthesiology at its meeting November 8-9 in the Medical Arts Building Auditorium elected as president Leonard M. Monheim, Pittsburgh, to succeed himself. All other officers also were re-elected. They are: first vice-president, Morgan Allison, Columbus, Ohio; second vice-president, Harold Cross, Encino, Calif.; secretary, Harry A. Sultz, Buffalo, N.Y., and treasurer, Joseph P. Osterloh, San Francisco.

International College of Dentists at its meeting November 9 in the Adolphus Hotel conferred honorary fellowships on Senator Joseph C. Clark (D., Pa.); Norman C. Topping, president, University of Southern California; Governor Frank G. Clement of Tennessee, and Mr. James Robinson, executive secretary of the Southern California State Dental Association. Herbert W. Mason, Indianapolis, was elected president to succeed Frank Martin, Toronto, Ontario. Others elected were: president-elect R. Gordon Agnew, San Francisco; vice-president, Joseph B. Kennedy, Des Moines, Iowa; treasurer, Fred A. Richmond, Kansas City, Kan., and secretary-general, H. O. Westerdahl, Minneapolis.

The newly-elected president of the United States section is Bruce R. Kurtz, Pasadena, Calif., who succeeds James J. Vaughn, Nashville. Other section officers are: president-elect, Reuben E. Miller, Easton, Pa.; vice-president, Reuben N. Albinson, Minneapolis, and treasurer, Roy F. West, Seattle.

American Association of Public Health Dentists at a meeting November 8 in the Dallas Hotel elected as president Polly Ayers, Birmingham, Ala., to succeed Roy D. Smiley, Indianapolis. Others elected were: president-elect, C. V. Tossy, Lansing, Mich., and secretary-treasurer, Charles L. Howell, Indianapolis.

American Association of Dental Editors installed as its new president Floyd D. Ostrander, Ann Arbor, Mich., to succeed Wesley J. Dunn, Toronto, Ontario. The association held its annual conference on dental journalism November 8 in the Statler Hilton Hotel. Morris J. Wilson, Greenville, Ky., is the president-elect. Sidney Epstein, San Francisco, was elected secretary-treasurer, and Ralph Rosen, University City, Mo., was re-elected editor. Belle Fiedler, Ann Arbor, Mich., was named vice-president.

Walter Hyde, Minneapolis, received the

first William J. Gies editorial award for his editorial, "Throw-Aways," which appeared in the July 1957 issue of *North-West Dentistry*. The award was presented by George C. Paffenbarger, a member of the board of directors of the William J. Gies Foundation for the Advancement of Dentistry. This award, which includes a prize of $200, will be an annual event.

American Denture Society at a meeting November 7-8 in the Adolphus Hotel elected Carl T. Ostrem, Des Moines, Iowa, as president to succeed Frederick N. Harris, Pasadena, Calif. Others elected were: president-elect, Lindsey D. Pankey, Coral Gables, Fla.; secretary-treasurer, Victor L. Steffel, Columbus, Ohio, and vice-president, Lamar Harris, Chicago.

Association of American Women Dentists, meeting November 10-13 in the Baker Hotel, elected as president Natalie McDonald, Englewood, N.J., to succeed Nancy Holmes, Dallas. Others elected were: president-elect, Elsie C. Schildwachter, Huntington Park, Calif.; secretary-treasurer, Goldanna Cramer, Salem, N.J., and district chairmen: Hazel F. Haughey, Wilmington, Vt.; Virginia Englett, Atlanta, Ga.; Evelyn L. Jung, Buffalo, N.Y.; Elizabeth Graves, Indianapolis; Dorothy Hard, Ann Arbor, Mich.; Margaret Toalson, Clayton, Mo., and Edith Straus, Beverly Hills, Calif.

American Academy of Periodontology met November 6-8 in the Baker Hotel and elected as president Joseph L. Bernier, of the Armed Forces Institute of Pathology, Washington, D.C., to succeed Donald A. Kerr, Ann Arbor, Mich. Other officers elected were: president-elect, James P. Hollers, San Antonio, Texas; secretary, Clarke E. Chamberlain, Peoria, Ill., and treasurer, James E. Aiguier, Philadelphia.

Charles H. M. Williams, Toronto, Ontario, and B. O. A. Thomas, Palo Alto, Calif., were elected to the executive council for three year terms. Harry Lyons, Richmond, Va., and Maynard K. Hine, Indianapolis, were named to the American Board of Periodontologists.

American Dental Interfraternity Council meeting at the Statler Hilton Hotel elected Myron A. Roberts, Buffalo, N.Y., as president to succeed Abram Cohen, Philadelphia.

J. C. Almy Harding, San Diego, was elected vice-president and Edward M. Grosse, Norwood, Pa., was elected secretary-treasurer. A report was made on the policies of American dental schools and the attitudes of their deans toward dental fraternities, as revealed by the answers to questionnaires. Among those guests who analyzed the report were Harold W. Oppice, chairman, Council on Dental Education; Raymond J. Nagle, president, and Marion W. McCrea, secretary-treasurer of the American Association of Dental Schools, and Mr. Reginald H. Sullens, newly-appointed secretary to that association.

American Dental Assistants Association met November 10-13 in the Baker Hotel and elected as president Mrs. Elma Troutman, San Francisco, to succeed Mrs. Magdalene Kulstad, La Habra, Calif. Others elected were: president-elect, Mrs. Joy Phillips, Phoenix, Ariz.; first vice-president, Miss Lois Kryger, Seattle; second vice-president, Mrs. Alicia King, Pittsburgh; third vice-president, Miss LaVeta Lehn, O'Neill, Neb.; secretary, Miss Corinne Dubuc, Pawtucket, R.I., and treasurer, Mrs. Harriet Darling, Huron, S.D.

American Academy of Gold Foil Operators meeting November 7-8 at Baylor University, installed as president James P. Vernetti, Coronado, Calif., to succeed Lester B. Myers, Omaha, Neb. Others elected were: president-elect, Herbert D. Coy, Richmond, Va.; secretary-treasurer, Charles C. Latham, Coronado, Calif., and elected to the executive council, John T. Ryan, Seattle.

Armed Forces Reserve Dental Officers' Association meeting November 9 in the White Plaza Hotel elected as president Bruce J. Morrow, Macomb, Ill., to succeed John S. Nelson, Pacific Grove, Calif. Others elected were: president-elect, W. D. Schellig, New Baltimore, Mich.; vice-president, Hubert S. Jackson, San Antonio; secretary-treasurer, David Lewis, Wheaton, Md.; board of governors: Manuel Maslansky, White Plains, N.Y.; H. D. Kilmer, Houston, Texas, and J. N. Stribling, Eatonton, Ga.

Delta Sigma Delta fraternity met November 8-10 in the Hotel Adolphus and elected as supreme grand master Kenneth C. Pruden, Paterson, N.J. Others elected were: supreme worthy master, Homer D. Butts, Jr., Pittsburgh; supreme scribe, Stephen G. Applegate, Detroit; supreme treasurer, Myron A. Roberts, Buffalo, N.Y.; past supreme grand master, J. Donald Shriber, Los Angeles; supreme historian, Cedric F. Harring, Brookline, Mass.; supreme senior page, Charles D. Yates, Dallas, Texas; supreme junior page, P. Rees Daugherty, New York City, and supreme tyler, J. Randall Luten, Sr., Little Rock, Ark.

Baylor University Dental Alumni Association elected Dan Peavy, San Antonio, Texas, as president to succeed Glenn R. Hillin, Dallas, Texas. Others elected were: vice-president, W. H. Louwien, Dallas; president-elect, Willis

Murphey, Fort Worth, Texas; secretary-treasurer, Joel F. Goodwin, Dallas, and member of the board of trustees, J. J. Goodwin, Longview, Texas.

American Academy of Physiologic Dentistry elected as president Carl G. Storberg, Duluth, Minn. Edward J Hempstead, St Louis, was chosen president-elect, F. J. Hoelscher, Seattle, was elected vice-president, and Edward Lawton, South Bend, Ind., was elected secretary-treasurer.

FURTHER ACTIONS OF THE BOARD OF TRUSTEES

The Board approved a new emblem developed for past presidents of the Association. The new emblems will be presented to the 21 living past presidents at a special ceremony during the Centennial Session.

Appointed as members of the General Committee on Local Arrangements for the annual session of the Association in 1960 in Los Angeles were the following: Bruce Kurtz, J. Lorenz Jones, Arthur E. Aull, James P. Bowers, Carl Rasmussen, Clarence Honig, John P. Frush and Howard V. Jones.

HOUSE OF DELEGATES

Among actions by the House of Delegates taken at the Dallas meeting were the following:

Commended Walter E. Dundon, chairman, and the Council on Dental Trade

Past presidents of the Association were photographed at the 99th annual session in Dallas. Standing, left to right: H. B. Washburn, Clyde Minges, Harold Oppice, LeRoy M. Ennis, Otto Brandhorst, Leslie M. FitzGerald, Daniel F. Lynch, Bernerd C. Kingsbury and Harry Lyons. Seated, Marcus L. Ward, C. Willard Camalier, Oren A. Oliver, C. Raymond Wells and Sterling V. Mead.

and Laboratory Relations for their excellent work and for the fine relationship they have established between the Association and the National Association of Dental Laboratories;

Congratulated George C. Paffenbarger, director of the Association's research division at the National Bureau of Standards, for the various honors bestowed on him;

Reaffirmed its support of the program of the voluntary health agencies of the nation and expressed the view that such voluntary agencies should be free to conduct their own campaigns for public support and public education.

OFFICERS AND TRUSTEES

Percy T. Phillips, New York City, was installed as president of the American Dental Association at the final session of the House of Delegates November 13. He is the first native New Yorker to occupy that post. In 1948 the House of Delegates elected Dr. Phillips as its first speaker, and he was re-elected to this post in 1949 and 1950. In 1951, he was elected as a member of the Board of Trustees representing the Second District. He was completing his second term when he was named president-elect. He is a member of the board of governors and executive committee of the Dental Society of the State of New York and is a former president and currently a member of the board of directors of the First District Dental Society of the State of New York. He is also a former president of the Bronx County Dental Society. Dr. Phillips is a member of the Dental Advisory Committee of the Department of Defense and of the Inter-Association Committee on Health. He is also one of the four dentist members of the Commission on the Survey of Dentistry, which is the executive body for a comprehensive survey being conducted this year and next by the American Council on Education. Dr. Phillips is the recipient of both the Henry Spenadel Award and the William Jarvie Award. He is a member of the Fédération Dentaire Internationale, the New York Academy of Dentistry and the New York Institute of Clinical Oral Pathology, a Fellow of the American College of Dentists and the International College of Dentists.

Paul H. Jeserich, president-elect, is from Ann Arbor, Mich. He has served two terms as Trustee for the Ninth District with his second being the current one, which he has relinquished to accept the post of president-elect. Dean of the University of Michigan School of Dentistry and director of the W. K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry, Dr. Jeserich has had a long career in dental education. He has been on the school's full-time faculty since 1933, advancing from assistant professor of operative dentistry to the position of dean in 1950. He has served the Association on the Council on Dental Therapeutics, Judicial Council and International Relations Committee. He is a past president of the Michigan State Dental Association.

Arthur W. Easton, of Norway, Me., is the re-elected Trustee for the First District. He is a past president of the Maine Dental Society and of the Maine Board of Dental Examiners. For many years he has served as a member of the American Dental Association's House of Delegates. In addition to his activities in the dental profession, Dr. Easton has served as moderator of Norway town meetings for many years and as president of the Norway National Bank for 22 years. He is a Fellow of the American College of Dentists.

Henry M. Willits of Dubuque, Iowa, is the new Trustee for the Tenth District. Active in organized dentistry at district, state, and national levels for many years, he has been a member of the Council on Dental Education for two terms, serving as chairman in 1951, and has been a member of the House of Delegates for several years. He is a member of the Iowa State Board of Dental Examiners, having served as secretary for his final five year term, and is an associate member of the American Association of Dental Examiners. He is a former editor of the *Iowa State Dental Journal*, a Fellow of the American College of Dentistry, and has been engaged in the practice of general dentistry in Dubuque since 1919.

HILLENBRAND NAMED TO GROUP STUDYING DOCTOR SHORTAGE

Formation of a 21-member medical consultant group to help overcome the nation's shortage of physicians was announced recently by Leroy E. Burney, Surgeon General of the Public Health Service.

Harold Hillenbrand, Association secretary, is one of the two dentists on the

panel. Other members are leading administrators and educators of the health professions.

The advisory group's task will be to determine how the nation can be supplied with adequate numbers of well qualified physicians and other medical manpower over the next decade.

At the first meeting of the group in Washington, the American Dental Association was cited for its studies on dental manpower and health.

The other dental member of the group is Emory W. Morris of Battle Creek, Mich., president of the W. K. Kellogg Foundation.

DENTAL ABSTRACTS NOW IN ITS FOURTH YEAR

With its December 1958 issue, DENTAL ABSTRACTS concluded its third 768-page volume since the American Dental Association began publication of its monthly abstract journal in January 1956.

The 12 monthly issues comprising Volume 3 of DENTAL ABSTRACTS include 938 abstracts, of which 93 (10 per cent) were illustrated. The 938 original articles were written by 1,095 authors in 42 countries. Also presented in Volume 3 were the titles of scores of Doctoral and Master's dissertations of dental interest, accepted by dental schools in many countries. Dozens of items of new equipment for dentists were described in a new department.

The December 1958 issue includes the annual subject and author indexes to Volume 3, so that readers may bind their indexed 1958 issues immediately. The annual index carries a list of 271 periodicals abstracted during the year.

There is hardly an aspect of dentistry that is not covered by one or more abstracts in 1958.

"We are seeking in each volume of DENTAL ABSTRACTS to give the reader a panoramic view of the best that is being written on dental subjects throughout the world each year," said Lon W. Morrey, editor of the American Dental Association.

"If the dental historian of the future wishes to know in any given year what dental technics were being practiced or advocated, what researchers were achieving, what materials and therapeutics were in use, what subjects were being taught in the world's dental schools, what organizations were active, and what problems were agitating dentists—in North and South America, Europe, Asia, Africa and Australia—he will find the answers in the annual volumes of DENTAL ABSTRACTS."

Subscriptions for Volume 4 of DENTAL ABSTRACTS are now being taken. The annual subscription price is $8 a year for domestic subscriptions and $9 a year for subscribers abroad. Subscriptions may be mailed to the Subscription Department, American Dental Association, 222 East Superior Street, Chicago 11.

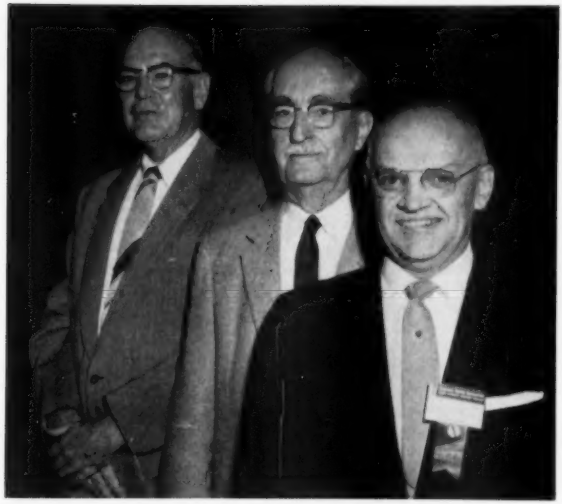
RELIEF FUND CONTRIBUTIONS FALLING BEHIND LAST YEAR'S

Although seven state societies and one Federal Dental Service have exceeded their quotas, total contributions to the American Dental Association's Relief Fund are lagging behind the percentages of last year at this date.

Contributions of $73,585.04—73.6 per cent of the goal of $100,000—had been received by the Council on Relief by December 15, 1958, according to chairman H. R. Bleier of Milwaukee.

Those constituent societies meeting or surpassing their quotas are: Alabama, with 101.5 per cent; Delaware, 100.0; Hawaii, 113.0; Nevada, 105.9; New Mexico, 114.2; North Dakota, 148.3; Wyoming, 124.1, and the U. S. Public Health Service, 120.2.

Dr. Bleier urged that dentists send their contributions as soon as possible to the A.D.A. Relief Fund, 222 E. Superior St., Chicago 11. "The cause is highly deserving and the need is great," he said.



First, second and third vice-presidents of the Association are shown, respectively, from the left: P. Earle Williams, James E. John and Walter E. Dundon, elected at the 99th annual session at Dallas.

COMPONENT SOCIETIES TO OBSERVE ASSOCIATION CENTENNIAL WITH DINNERS, CIVIC LUNCHEONS, CONTESTS, DISPLAYS

One hundred years of health service to the public by the American Dental Association will be celebrated in local communities throughout the country during 1959. News of stepped-up celebration plans from constituent societies continues to come into the Centennial Committee at the Central Office.

In addition to the activities listed in last month's JOURNAL the following society activities have been scheduled:

Arkansas • The Arkansas State Dental Association is tentatively planning a centennial civic luncheon as part of its 71st annual state convention in Little Rock, April 12-15. Centennial chairman is the state society secretary, Don M. Hamm of Clarksville.

Florida • The Central District Dental Society has appointed a centennial chairman for each city in its area and is arranging for radio, television and newspaper coverage of the Centennial Celebration. Centennial speeches at civic clubs are being planned.

Illinois • The Illinois State Dental Society will hold a centennial banquet as part of its annual meeting to be held in Peoria in May. The centennial issue of the *Illinois Dental Journal* will appear in January. Various centennial activities are being planned at the component level throughout the state. Carl E. Madda, Chicago, is state centennial chairman.

Maryland • Four of the eight component dental societies in the Maryland State Dental Association have announced that their February meetings will be devoted to centennial programs. National Children's Dental Health Week observances will be tied in with the A.D.A. Centennial during the opening week in February when Maryland dentists will present centennial programs at civic club meetings. In May, at a centennial civic luncheon during the state annual meeting, the association will honor a nondentist who has contributed to the advance of dental health. Nor-

man Chanaud, Centerville, is state centennial chairman.

Michigan • The Genesee County District Dental Society will present a day-long program February 3, including a scientific session in the Flint Public Health Auditorium in the afternoon and a centennial civic banquet in the evening. Mr. Charles S. Mott will be presented an honorary membership and distinguished service award by the society. The principal address will be given by Paul H. Jeserich of Ann Arbor, president-elect of the A.D.A. Centennial chairman is Kenneth J. Ryan of Flint.

Ohio • A poster contest, a "Perfect Teeth" contest, and a series of displays for bank and store windows are among the centennial activities being planned by the Toledo Dental Society. A centennial dinner dance will be held April 8 as part of the society's annual Clinic Day. Zane Z. Skalski is the society's centennial chairman.

Oregon • The Oregon State Dental Society has announced extensive centennial plans including a centennial banquet at the state meeting, a special centennial cover for the state journal in February, centennial dinner meetings during the week of February 8 by all of the district dental societies, a display of the history of dentistry during National Children's Dental Health Week, essay and poster contests for grade schools on "One Hundred Years of Dentistry" and extensive use of radio, television and newspapers.

Rhode Island • The Rhode Island State Dental Society will honor Albert L. Midgley of Providence as "Dentist of the Century" at its centennial banquet during the annual meeting, January 20, 21. State, civic and health leaders are expected to attend. Radio and television talks on the Centennial are also being planned, according to the state centennial chairman, William F. Decesare.

DENTAL TRADE PLEDGES

More than $140,000 has been pledged to date by members of the dental and allied trades for support of centennial activities. Commitments which have been made in the past month include:

Centennial Teaching Fellowships • The S. S. White Dental Manufacturing Company, and the Great-West Life Assurance Company each will support Centennial Teaching Fellowships in 1959. The fellowship supported by the Great-West Company will consist of one $2,500 scholarship to be awarded each year for five years. The S. S. White fellowship will consist of a $4,500 award to be made to a graduating dental student in 1959. Both fellowships are designed to encourage students to enter the teaching field.

Student Clinic Program • The Dentists' Supply Company of New York has agreed to support a nationwide Centennial Student Clinic Program at an estimated cost of $10,000. All dental schools will be asked to participate by holding student clinic days. The winning student clinician from each school will receive an all-expense trip to New York and will present his clinic in the scientific program of the Centennial Session.

Science Fair Program • The Oral B Company has given the Association a grant of $3,000 to support dental participation in Science Fair programs during the Centennial Celebration. This grant is described elsewhere in this issue.

Simultaneous Translation • Simultaneous translation service at the opening meeting and the general meeting of the Centennial Session will be provided through a $3,500 grant from the Kerr Manufacturing Company. Simultaneous translation, used for the first time at a U. S. dental meeting, will be provided in French, German, Spanish and English.

General Entertainment • The I. D. Caulk Company has given the Association a grant of $3,500 for partial support of one of the major social events at the Centennial Session—the evening of general entertainment. The exact form of this entertainment has not yet been decided. Under consideration is a musical program at Carnegie Hall.

Centennial Match Books • Dental societies soon will be receiving a supply of match books bearing the Centennial insigne in gold. The souvenir books, which may be distributed at centennial banquets and other state and local programs, are being supplied by J. F. Jelenko & Co., Inc.

The General Printing Company, printers of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION since 1928, have given the Association a grant of $5,000 to be used at its discretion to implement the Centennial Celebration.

BEAZLEY ASKS FOR REPORTS OF ABUSES OF F.T.C. RULES

In accordance with the resolution passed by the 1957 House of Delegates, reports of any apparent abuses of the amended Federal Trade Commission's *Trade Practice Rules for the Commercial Dental Laboratory Industry* should be reported to the Association by constituent societies, according to Bernard J. Beazley, secretary of the Council on Dental Trade and Laboratory Relations.

Mr. Beazley also calls attention to the 1957 resolution of the House of Delegates which states the Association's opposition "to the direct promotion to the public of any equipment, dental materials or any other product, the selection of which is exclusively the dentist's responsibility."

Information on any direct promotion to the public, or any abuse of the amended F.T.C. rules should be sent directly to Mr. Beazley at the Central Office.

GEORGE Y. OGAWA BECOMES ASSISTANT BUREAU HEAD

The appointment of George Y. Ogawa as assistant director of the Bureau of Economic Research and Statistics has been announced by Harold Hillenbrand, Association secretary.

Mr. Ogawa, who joined the Association staff in July 1956 as a statistician for the Bureau, is a native of Spokane, Wash. He attended Roosevelt University and received a master's degree in economics from the University of Chicago in 1954. He was formerly a statistician for the Industrial Relations Center of the University of Chicago.

ARTHUR MERRITT GIVES $500 MORE TO OUR DENTAL LIBRARY

In his own special observance of the American Dental Association's centennial, Arthur H. Merritt, past president of the Association, has donated $500 for the purchase of rare and historical books for the Bureau of Library and Indexing Service. This brings to $1,200 the contributions made by Dr. Merritt for this purpose.

"Such gifts," said Donald A. Washburn, Bureau director, "enable the library to continue in its efforts to increase its collection of historical dental volumes which add dignity and depth to our valuable collection of source materials."

Other dentists who may have historical books, copies of which are not now in the library, may wish to choose this centennial year as a fitting time to donate them. All such books carry the donor's name.

NEW LIFE-SAVING METHODS COVERED IN 'DENTAL REMEDIES'

Marking its 25th year of publication, *Accepted Dental Remedies*, 1959, published by the Council on Dental Therapeutics, is ready for distribution.

Expanded and revised chapters on dentifrices, emergency treatments and fluoride treatments, and new information on dietary supplements of fluorides are included in the new 224-page edition.

Updated descriptions of products evaluated by the Council together with pertinent monographs which have been rewritten in the light of current scientific information are also to be found. There are references to mouth-to-mouth and

mouth-to-airway methods in the technics of artificial respiration.

Accepted Dental Remedies, 1959, at $3 a copy, may be ordered from the Association. An order form appears on page A-32 of this issue.

ASSOCIATION URGES BACKING OF LOCAL SCIENCE FAIRS

Direct contact with high school pupils and an opportunity to present the profession of dentistry in an appealing light are provided by Science Fairs, according to Sholom Pearlman of the American Dental Association's Council on Dental Therapeutics.

The Association has embarked on a full-scale program to stimulate greater public interest in dentistry as a scientific profession. This is described in detail on page 114 of this issue.

The booklet, *Dental Projects for High School Science Students,* which is described in the special article, was published for the Association. Single sample copies are available to dentists free of charge. Special quotations on quantity lots will be made to dentists and dental societies. Requests should be addressed to Science Fairs, 222 E. Superior St., Chicago 11.

CLIPPINGS OF LABORATORY ADS REQUESTED BY COUNCIL

One of the continuing projects of the Council on Dental Trade and Laboratory Relations is a study of the advertising in public media of dental laboratories and mail order denture firms.

Bernard J. Beazley, secretary of the Council, urges that dentists continue to clip any such ads they may see in newspapers and magazines. These clippings, together with the names and dates of the periodicals in which they appear, should be sent directly to the Council at the Central Office of the American Dental Association, 222 E. Superior St., Chicago 11.

INSURANCE BENEFITS EXPAND UNDER A.D.A. GROUP PROGRAMS

An increase of benefits under the two insurance programs sponsored by the American Dental Association became effective January 1 after approval by the Board of Trustees of a recommendation by the Association's Council on Insurance.

Coverage under the Group Life Insurance Program written in the Great-West Life Assurance Company has been increased from $10,000 to $20,000. Peak benefits available under the Group Accident and Health Insurance Program written in the National Casualty Company of Detroit through the agency of M. A. Gesner, Incorporated, has been raised from $400 to $600 monthly.

Details of these programs are explained in the Council on Insurance Report beginning on page 124 of this issue of THE JOURNAL.

International

FIRST PANAMERICAN DENTAL CONGRESS ATTRACTS 3,000

Officials of the American Dental Association and others prominent in the dental profession in the United States were among the more than 3,000 who attended the first Panamerican Congress of the Mexican Dental Association. The Congress was held in November in Mexico City.

Paul Jeserich, president-elect of the A.D.A., addressed the assembly as the official representative of the Association. The Mexican Dental Association conferred honorary membership on Dr. Jeserich and on William R. Alstadt, immediate past president of the Association.

The program included lectures and panel discussions in which several North American dentists took part. Harold Hillenbrand, secretary of the A.D.A., ad-

dressed the Congress, emphasizing the urgent need for the health professions of all countries to arrive at a common denominator in order to achieve the betterment of health in the world. He said:

"There should exist a free exchange among the nations, not only of students and professors but also of standard quality levels with respect to work materials, studies, ideas and literature, scientific and otherwise, so that scientific achievement may be made known to the professions throughout the world."

Dr. Hillenbrand recommended an exchange of ideas on the licensing policies to practice the professions, "With this plan the problem of dental health could be resolved with the goodwill of the general public."

The Congress was welcomed to Mexico by the president of the country, Adolfo Ruiz Cortines, and presided over by Roberto M. Ruff. Among other speakers was Ambassador to Mexico Robert C. Hill, whose embassy held a reception for the U. S. visitors.

EDWARD R. BILKEY NEW EDITOR OF CANADIAN DENTAL GROUP

Beginning with the January issue of the *Journal of the Canadian Dental Association,* Edward R. Bilkey will assume the editorship. He was appointed to succeed Wesley J. Dunn, who resigned to devote his full time attention to his position as registrar-secretary-treasurer of the Royal College of Dental Surgeons, and also to serve as secretary-treasurer of the Dentists' Legal Protective Association of Ontario.

Dr. Bilkey has been a member of the Faculty of Dentistry staff of the University of Toronto for seven years. He was the first vice-president of the Canadian Society of Dentistry for Children and two years later became the Society's president.

For several years, Dr. Bilkey served as a member of the Dental Public Health Committee of the Ontario Dental Association and has been a member of the Public Relations Committee of the Canadian Dental Association for the past two years. He has been an associate editor of the *Journal of the Canadian Dental Association* for the province of Ontario for the past several years.

Edward R. Bilkey

PHILIPPINE ASSOCIATION ASKS W.H.O. AID IN FLUORIDATION

A request to the World Health Organization for aid in fluoridating the public water supplies in the Republic of the Philippines has been made. The request was contained in a report made by Dominador G. Santos, president of the Philippine Dental Association and representative of the Fédération Dentaire Internationale, to the ninth session of the W.H.O. Western Pacific Regional Committee which met recently in Manila.

"The Philippine Dental Association considers fluoridation of communal drinking water in the Philippines as the most important problem connected with dental health," said Dr. Santos. "Tooth decay may not be as spectacular as malaria and smallpox, but a program which offers promise against an endemic disease like dental caries is entitled to support from W.H.O. We ask support for such a project in the Philippines in the budget under consideration."

PHILIPPINE ASSOCIATION TO HOLD 51ST SESSION IN MAY

The Philippine Dental Association will celebrate the 51st anniversary of organized dentistry in Manila May 13-17.

Dominador G. Santos, president of the association, has extended an invitation to members of the American Dental Association to participate in the scientific meeting or to attend as visitors.

The schedule will include an essay program, table clinics and demonstrations, slide and movie clinics, other exhibits and social activities. Visitors will also be offered a tour to scenic and historical spots in Luzon including Corregidor and Bataan.

Further details may be obtained from Dr. Santos at P. O. Box 1142, Manila.

Newly elected officers of the Conference of State Society Officers: (left to right) Thomas D. Holder, Portland, secretary-treasurer, Oregon State Dental Association, vice-president; Carl V. E. Cassel, St. Paul, secretary, Minnesota State Dental Association, the new president, and Alvin B. Coxwell, Jr., Louisville, secretary-treasurer, Kentucky Dental Association, Conference secretary.

General

DUKE TREXLER ASSUMES POST WITH ORAL SURGEONS GROUP

The American Society of Oral Surgeons announces that Mr. Duke C. Trexler will become its executive secretary beginning January 1.

A graduate of Georgetown University, Mr. Trexler holds a master's degree from the University of Texas. He has been director of the University Evening College, University of Mississippi, and director of the Department of Conferences and Institutes of that school. In the latter position he developed postgraduate programs in such fields as dentistry, medicine, nursing for about 70 associations. In this connection he was given honorary membership in the Mississippi Dental Association and the Texas Dental Health Conference.

Mr. Trexler's army service was in the U. S. and the Mediterranean theater during World War II. He holds a reserve commission as Captain, USAR.

In his capacity as the first full-time executive secretary of the executive council of the American Society of Oral Surgeons, Mr. Trexler will open the new headquarters of the society in the American Hospital Association Building, 840 Lake Shore Drive, Chicago.

NEBRASKA UNIVERSITY HONORS BERT HOOPER ON RETIREMENT

At the Alumni Homecoming Reunion of the University of Nebraska College of Dentistry last month, Bert L. Hooper, retiring dean, was paid special tribute. Highlight of the program was a dinner dance held in honor of Dr. and Mrs. Hooper.

Internationally known as a prosthodontist, Dr. Hooper has been affiliated with the dental college since 1923 and has been dean since 1939. He is well-known for his many researches and inventions and has acquired one of the world's largest private libraries of color motion pictures of denture work.

Dr. Hooper has held office in the

American Academy of Denture Prosthetics and the American Full Denture Society, and is also a member of the American Dental Association, the International Association of Dental Research and the American Association of Dental Schools. He is a Fellow of the International College of Dentists.

SEMINAR ON BLEEDING SLATED FOR ROWE SMITH FOUNDATION

"The Blood and Bleeding" will be the subject of the annual seminar of the Rowe Smith Memorial Foundation to be held January 18-21 at Fly-n-Fish Lodge on Caddo Lake, Karnack, Texas.

Clinicians will be Emanuel Cheraskin, Joseph M. Hill, Raymond W. Monto, M.D., and Robert B. Shira. Lon W. Morrey, editor of THE JOURNAL, will be guest of honor.

EDGAR COOLIDGE RECEIVES HEALTH SERVICE AWARD

The 1958 Distinguished Service Award of the Illinois Interprofessional Council has been given to Edgar D. Coolidge, Evanston, Ill.

Dr. Philip R. Brachman, president of the Council, said, in announcing the award, that Dr. Coolidge was being recognized "for his dedicated efforts and contributions for the health and welfare of the people of the State of Illinois."

The award will be presented at the organization's annual dinner at the Swedish Club of Chicago January 27.

LUNCHEON MEETING PLANNED BY NORTHWESTERN ALUMNI

The Alumni Association of Northwestern University Dental School will hold a luncheon at noon Wednesday, February 11, in the Grand Ballroom of the Conrad Hilton Hotel.

Reservations are required. Tickets will be available at Alumni Headquarters, Room 557-A, at the hotel during the course of the Chicago Midwinter Meeting.

Ernest A. Branch

ERNEST BRANCH, N. CAROLINA DENTAL DIRECTOR, DIES

Ernest A. Branch, 70, director of oral hygiene for the North Carolina State Board of Health since 1929, died at his home in Raleigh December 3 after a long illness.

Dr. Branch, who had been chairman of the oral hygiene section of the American Dental Association, was also a former president of the American Association of Public Health Dentists, of the State and Territorial Dental Directors and of the North Carolina State Dental Society.

In 1952, Dr. Branch was presented the Carl V. Reynolds award of the North Carolina Public Health Association for his efforts in behalf of water fluoridation for the state.

He was the founder, and for several years director, of the Institute of Public Health Dentistry at the University of North Carolina.

AMERICAN CANCER SOCIETY OFFERS CLINICAL FELLOWSHIP

The oral pathology division of the School of Dentistry, University of Minnesota, has announced an American Cancer Society Clinical Fellowship in oral pathology for the year 1959-1960.

The Fellowship will afford training in

advanced oral pathology leading to an M.S. degree in oral pathology. The program will include training in dermatology, pediatrics, tumor pathology, metabolism, and biostatistics in addition to ample clinical experience. The annual stipend is $3,600 tax-free.

Interested individuals may apply to Dr. Robert J. Gorlin, chairman of oral pathology, School of Dentistry, University of Minnesota. A *curriculum vitae* must accompany the application which must be sent by February 15, 1959.

PROMOTED TO ASSOCIATE AT NAT'L BUREAU OF STANDARDS

Dr. Irl C. Schoonover, formerly chief of the dental materials section, National Bureau of Standards, has been named Associate Director for Planning at the Bureau.

Dr. Schoonover, chief of the NBS mineral products division, has been a member of the Bureau's staff since 1928. He is an honorary member of the American Dental Association.

As associate director, Dr. Schoonover will be the principal staff adviser to the director on program development, coordination, and evaluation. He will give special attention to the long-range activities of the Bureau in relation to the needs of science and technology.

GIES FOUNDATION DIRECTORS MAKE CONTRIBUTIONS APPEAL

Directors of the William J. Gies Foundation for the Advancement of Dentistry, one of few devoted solely to dental interests, are making a general appeal for contributions needed in the furthering of the foundation's works.

Among more recent grants made by the foundation was a major one to the International Association for Dental Research, which will help them to reduce the backlog of scientific papers in the *Journal of Dental Research*.

Headquarters for the foundation are at 221 Fourth Ave., New York 3. Bissell B. Palmer is president.

TWO OFFICIALS LEAVE POSTS WITH MEDICAL ASSOCIATION

Two officials of the American Medical Association have relinquished staff positions, one by retirement and one by resignation.

Dr. Austin Smith, editor of the Journal of the A.M.A. since 1949 and successor to Dr. Morris Fishbein, resigned, saying "There is need for new blood in the key administrative positions of the association."

Frank G. Dickinson, Ph.D., director of the A.M.A. Bureau of Medical Economic Research, retired to do private consulting work and conduct research under the sponsorship of a research foundation. He joined the staff in 1946 after teaching economics at the University of Illinois for 25 years.

TESTIMONIAL DINNER WILL HONOR FRED J. WOLFE

The New Orleans Dental Society will hold a testimonial dinner to honor Fred J. Wolfe February 21 at the Monteleone Hotel, New Orleans.

Dr. Wolfe has been active in the dental profession since he was graduated from the New Orleans College of Dentistry in 1908. He is a member of the New Orleans and the Louisiana State Dental Societies, and a past president of the latter.

Dr. Wolfe was a Trustee of the American Dental Association for the Twelfth District for seven years during and after World War II, and was first vice-president of the Association in 1935-36.

FORMER COUNCIL CHAIRMAN MEMBER OF YOUTH COMMISSION

Philip E. Blackerby, Jr., of Battle Creek, Mich., has been named by President

Eisenhower as one of the 12 vice-chairmen of the National Committee for the 1960 White House Conference on Children and Youth.

Dr. Blackerby, former chairman of the Association's Council on Dental Education, is associate director of the W. K. Kellogg Foundation.

The committee, composed of 92 leaders in programs serving youth, held a two-day planning conference in Washington, D. C., last month, and met at the White House with President Eisenhower.

PRESIDENT PROMOTES CATHROE TO TEMPORARY MAJOR GENERAL

President Eisenhower has approved the nomination of Brig. Gen. James S. Cathroe, USAF (DC), Assistant for Dental Services in the Office of the Surgeon General of the Air Force, for promotion to the temporary rank of Major General.

By this action the President placed the ranking officer in the Air Force Dental Corps on a par with those of the Army and Navy.

CHARLES CARPENTER, WYOMING DENTIST, DIES IN FALL ON ICE

Charles H. Carpenter, 62, long-time civic leader in Casper, Wyo., died November 19 as a result of a fall at his mountain home the day before.

Dr. Carpenter, former state senator, had been a dentist in Casper since 1921 and was the first state dental director under the reorganized Wyoming Department of Health. He was graduated from the Chicago College of Dental Surgery, and did postgraduate work at the University of Michigan. He served in the Army Dental Corps during World War I.

At the 1945 session of the Wyoming state legislature, Dr. Carpenter introduced and secured passage of a bill to create a division of dental health in the state health department.

A CORRECTION

The dates of the 1959 meeting of the Ohio State Dental Society were erroneously listed in the *Announcements Section* of last month's JOURNAL. The correct dates are October 25-28.

Dental Education

TWO INTERNSHIPS AVAILABLE AT KANSAS CITY HOSPITAL

The Veterans Administration Hospital of Kansas City, Mo., has two rotating internships available starting July 1. The program is given in cooperation with the University of Kansas City School of Dentistry.

Postgraduate and graduate courses are taken through the University and include a series of seminars in oral pathology, prosthetics, oral surgery, radiology, endodontics and restorative dentistry.

The stipend is $2,500 per year. A certificate of internship is issued by the Veterans Administration Hospital, and a certificate of postgraduate study by the dental school.

Application should be made directly to J. P. Darnell, Chief of Dental Service, Kansas City Veterans Administration Hospital, Kansas City, Mo.

EASTMAN DENTAL DISPENSARY LISTS GRADUATE OPENINGS

In an expansion of its past activities in graduate opportunities, Eastman Dental Dispensary, Rochester, N. Y., announces 20 internships and clinical Fellowships

providing preparation for general practice or dentistry for children.

Elective part-time assignments are offered in periodontics, and also in the dental clinics of Strong Memorial and Genesee Hospitals and in the Dispensary research laboratories. A full-time permanent staff provides supervision, lecture, demonstration and seminar programs. Appointments, paying $190 to $290 per month, are from September to June.

Continuing second and third year appointments are available in orthodontics, periodontics, pedodontics and research. These may be combined with a master's degree program.

Inquiries should be directed to Dr. Basil G. Bibby, director, Eastman Dental Dispensary, 800 Main St. E., Rochester 3, N. Y.

ORAL SURGERY INTERNSHIP OPEN IN SAN FRANCISCO

A one-year internship in oral surgery beginning July 1 is being offered at the San Francisco General Hospital. This internship is approved by the Association's Council on Dental Education.

Application forms and information regarding the program may be obtained by writing to Melvin Sherman, D.D.S., Division of Oral Surgery, School of Dentistry, University of California Medical Center, San Francisco 22.

SCHOOLS SCHEDULE GRADUATE PROGRAMS, REFRESHER COURSES

California • The University of California School of Dentistry announces a three-year graduate program in oral surgery for the year beginning July 1. Training includes clinical and hospital experience and study in the basic sciences. The program is designed to fulfill the requirements of the American Board of Oral Surgery. Further information may be obtained from the school. Application blanks should be requested from the University of California Graduate Division in Berkeley.

Illinois • A two-day postgraduate course in premedicating agents and general anesthesia will be given February 12 and 13 immediately following the Chicago Dental Society Midwinter Meeting. The course is under the direction of Dr. Elaine Stuebner and the enrollment fee is $50. Further information may be had from: Division of Postgraduate Education, University of Illinois College of Dentistry, 808 South Wood St., Chicago 12.

Boston • The following courses have been scheduled by Boston University School of Medicine, department of stomatology: Advanced course in periodontal therapy, March 2-7; technics in the general practice of dentistry, March 9-14; periodontal therapy, March 16-27; tooth preparation and elastic impression material technics in restorative dentistry, March 30-April 1; complete denture prosthesis, April 6-15; occlusal adjustment, April 27-May 1; endodontics, May 11-15; periodontal prosthesis, May 18-22; surgical technics employed in periodontal therapy, May 25-29; pulp protection in operative dentistry, June 4-6, and periodontal pathology, June 8-12. Details may be obtained from: Director of Postgraduate Studies, Department of Stomatology, Massachusetts Memorial Hospital, 750 Harrison Ave., Boston 18.

Michael Reese • The medical laboratory and its role in clinical dentistry, a new type of course, will be given February 12 and 13 by the department of dentistry, Michael Reese Hospital and Medical Center, Chicago, under the direction of Emanuel Cheraskin and Arthur Elfenbaum. The tuition is $35 and application should be made directly to the hospital, Chicago 16.

Minnesota • A five-day course in advanced oral pathology will be given April 20-24 at the University of Minnesota. The fee is $65. Further information may be obtained from Robert J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis.

Northwestern • Late winter and spring courses at Northwestern University School of Dentistry are as follows: Complete denture procedures in general practice, March 30-April 2; major oral surgery, April 6-10; prosthetic and orthodontic rehabilitation for the cleft palate patient, April 6, 7; high speed instrumentation in operative dentistry, April 15, 16; pedodontics, April 15, 16; the use of drugs in dental practice, April 29-May 1, and diagnosis, roentgenography and treatment planning, May 4, 5. Application should be made to Northwestern University, School of Dentistry, 311 E. Chicago Ave., Chicago 11.

Ohio • Among postgraduate courses listed at the Ohio State University College of Dentistry are: Evaluation of newer operative methods, Jan. 23, 24; endodontics, March 2-6; dental drugs in action, May 1, 2, and periodontics, May 4-8. All courses are limited in enrollment. Applications may be secured from the Postgraduate Division, College of Dentistry, Ohio State University, Columbus 10, Ohio.

Oregon • Seven courses for the months of March and April are scheduled to be given at the University of Oregon Dental School. They are: Periodontics 1, by Lewis Fox, March 16-18; periodontics 2, Lewis Fox, March 19, 20; dentistry for children, Charles A. Sweet, March 22-27; endodontics, Ralph F. Sommer, March 30-April 4; dowel attachment partials, LeRoy E. Knowles, April 13; oral diagnosis, Robert J. Gorlin and Norman H. Rickles, April 27, 28, and preventive dentistry, Leonard S. Fosdick, April 29, 30. Further information may be had from Vinson M. Weber, Department of Postgraduate Education, University of Oregon Dental School, 611 S. W. Campus Drive, Portland, Ore.

Pennsylvania • The University of Pennsylvania School of Dentistry has listed the following postgraduate courses for the month of April: Pulp reactions, April 2, 3; minor tooth movement, April 8-10; endodontics, April 13-24; clinical occlusion, April 20-24, and complete dentures, April 27-May 1. Application should be made to the school at 4001 Spruce St., Philadelphia 4.

Southern California • Birger N. Ostby will instruct a course in endodontics-pathology and treatment January 29, 30 at the University of Southern California School of Dentistry in Los Angeles. On February 2 and 3 the clinical physiology of occlusion will be discussed by Laszlo Schwartz and a course in dentistry for children will be directed by Clinton C. Emmerson February 15-20.

Enrollment for all classes is limited. Application should be made to the division of postgraduate instruction of the university at University Park, Los Angeles 7.

Temple • Closed-circuit television and high-speed equipment will be utilized in postgraduate studies at Temple University. Five of the 21 courses scheduled are listed as follows: fixed prosthesis—advanced, Wednesdays, Jan. 7 through March 25; clinical oral pathology, January 15-17; advanced radiodontics, January 22-24; practice administration, February 28, and time, motion and speed, March 1-3. Information may be obtained from: Temple University School of Dentistry, Postgraduate Division, Broad above Allegheny Ave., Philadelphia 40.

Washington • Four refresher courses offered at the University of Washington are: modern concepts in periodontics, February 13-15; compound amalgam restorations, February 27-March 1; pedodontics, March 2-4, and clinical occlusion, March 9-13. Applications should be made to: Department of Postgraduate Dental Education, University of Washington School of Dentistry, Seattle, Wash.

Public Health

P.H.S. TO HOLD COMPETITIVE EXAMS FOR DENTAL POSTS

Competitive examinations for appointment to the Commissioned Corps of the United States Public Health Service will be held throughout the nation in March and April, Surgeon General Leroy E. Burney has announced.

Regular Corps examinations for dentists, among other classifications, will be held April 21, 22, 23 and 24. Applications for these examinations must be filed with the Surgeon General no later than March 6.

Application forms and further information may be obtained by writing to the Surgeon General, U. S. Public Health Service (P), Washington 25, D. C.

Subscripts • J. R. Robinson is the new dental director of the Bureau of Dental Health for the State of Missouri. He has been in office since August 1958.

international correspondence

News from Great Britain

NATIONAL HEALTH SERVICE

The Report of the Ministry of Health for 1957 (H.M. Stationery Office, Part 1, Cmd. 495, price 12/–), covering England and Wales only, provides statistics on the general dental services.

For the first time in many years the percentage of all National Health Service courses of treatment devoted to patients under 21 declined, although by only the small proportion of 0.3 per cent. The percentage of courses of treatment devoted to the priority classes as a whole, that is, to expectant and nursing mothers and to those under 21, still totaled nearly 50 per cent. One effect claimed for the revised scale of fees introduced in April 1957, is that because of the higher fees paid for the conservation of deciduous teeth, the number of conservative courses involving such teeth rose from 608,000 to 718,000 while the number of cases involving extractions fell from 1,100,000 to 1,050,000.

On dental manpower the report states that a general shortage of dentists persists throughout the country. It draws attention to the uneven distribution of dentists in England and Wales—in the north of England one dentist to 5,100 citizens, in the south one to 3,200—but admits that "there are wide variations in the pattern of demand for dental treatment in different parts of the country."

A most informative table shows the age distribution of practitioners in the general dental services and gives the startling information that 28 per cent are over the age of 60 and one-third over 55. Understandably the report comes to the conclusion that "the shortage of dentists is bound to become more acute before measures to increase dental manpower can bear fruit."

The total gross fees payable to dentists in 1957 increased from £37,145,000 in 1956 to £40,715,000 in 1957, of which just over 8 million pounds was payable by patients.

DENTAL EDUCATION

In a letter to the *British Dental Journal*, October 7, Alexander MacGregor, professor of dental surgery and director of dental studies, University of Birmingham, writes as the individual responsible for the direction of teaching in the Dental School as follows:

"It is true that dental mechanics is no longer a subject for formal examination in the curriculum for the B.D.S. degree of the University of Birmingham. It is, however, still a subject for a class examination and the further progress of the student depends upon his passing it. Its removal from the list of formal parts of the examination has not been done without considerable thought, and clearly not without the full agreement and co-operation of my friend and colleague, John Osborne, professor of dental prosthetics.

"The reasons underlying the decision are briefly as follows: firstly, the ever-increasing demands made on the student as scientific knowledge, technical and clinical procedures gain in complexity. Our object in the schools, however, must still be to train our students to the best of our ability primarily as clinicians; secondly, with very few exceptions, students will not undertake their own routine mechanical work when they enter practice after qualifying.

"For these reasons, in the new curriculum now introduced, the old course in dental mechanics has been replaced by a shorter course in basic dental technics, including casting, soldering, the use of acrylic resins, the setting

up of artificial teeth, and so forth, with emphasis placed on the clinical applications. This allows more time to be spent at chairside, and in the course in clinical prosthetics students will in the first instance set up teeth. This is before handing over later cases in their entirety to technicians to complete the technical work. It is felt that far more can be gained by the student seeing for himself how wrong a faulty arrangement of teeth looks in the patient's mouth than by repeating the exercise on numerous occasions on an impersonal articulator.

"We do not feel that with a shorter course in basic dental technics it would be justifiable to leave the examination in the subject as a formal part of the B.D.S. examination. A class examination has in consequence been substituted. The shortening of the course, together with some streamlining in other parts of the curriculum, now enables us to set aside a period of three to four months at the end of the curriculum in which the student treats patients as patients, undertaking all forms of treatment and thereby correlating the departmental knowledge that he has gained. We feel that interposing this transitional phase between departmental teaching and clinical practice will prove of the greatest benefit to the student and introduce him to the all-too-often forgotten idea that he will be responsible for the well-being of the patient's mouth as a whole. We hope in consequence that any small loss on the swings will be more than compensated for by our gains on the roundabout."

SCHOOL DENTAL SERVICE

This is the 50th year of Sheffield School Health Service. The city has a population of 498,500 and a school population of over 75,000. There are 159 schools and 16 special schools. As far as the dental condition of the children in these schools is concerned, Dr. Marion Taylor, principal school medical officer, strikes a somber note. It is sad to relate, she writes, that the teeth of the Sheffield children are not in a healthy state, and it is no comfort to know that the incidence of dental caries has never been so high in the country as a whole.

In his report, the principal school dental officer, Mr. Edgar Copestake, discusses the position and is concerned about the apathy shown by most parents with regard to the care of the teeth. This is shown by the fact that, of all the parents throughout the city offered dental treatment for their children, no less than 50 per cent refused it.

The School Dental Service has been in existence 50 years and an examination of the staffing problems presents a future of a service unable as a career to attract young dentists, of an aging permanent and experienced staff, and of an increasing trend towards a part-time service. The British Dental Association has long held the view that prospects and pay are the root cause of this situation, members of the profession being at a grave disadvantage compared with other professions in being unable to rise to a position similar to that of the heads of other departments, because the Dental Service is not self-governing.

The basic rates of remuneration for clinical work also compare unfavorably with those obtainable in the National Health Service.

In 1957 the whole time dental officers numbered approximately 1,014 for a school population of 6,776,549, a ratio of 1:6,682.

ITEMS OF INTEREST

A most interesting lecture on the "Classification of Odontogenic Tumors" was given by Dr. J. J. Pindborg of the Royal Dental College, Copenhagen, at the Institute of Dental Surgery, Eastman Dental Hospital, London. These lectures given by visiting colleagues are always well attended and extremely well received.

In the September 16th issue of the *British Dental Journal* there is an interesting general article "Notes on a Visit to Russia" by Frederick J. Ballard. These are most informative and useful notes.

On the occasion of the formal opening of the new Dental School at Umea in Sweden, Professor Martin Rushton was honored by being the recipient of one of the six honorary doctorates in odontology. This is a great honor to the dental profession in Great Britain.

Professor R. B. Lucas has been appointed Dean of the Royal Dental Hospital School of Dental Surgery in succession to Mr. H. L. Hardwick who retired on October 1, 1958. Professor Lucas was previously Vice-Dean of the School. Mr. Hardwick had held his appointment for ten years, and during that time much of importance happened to the school. The many alumni and friends of the "Royal" will wish Professor Lucas success during his period of office, and Mr. Hardwick their warm congratulations on his successful tenure of office.

Annual Conference—British Dental Association • Arrangements for the 79th annual conference of the association, to be held in Torquay from May 25 to 29, are well in hand and a full and interesting program of meetings and social events is anticipated. The 1960

conference will be held in Edinburgh during the week of July 10.

Royal Society of Medicine, London • It will interest the readers of this newsletter to know that a new form of membership has been instituted known as "Affiliateship" which will provide most of the advantages which full Fellowship affords at the annual subscription of £5 for a whole session which runs from October 1 to September 30 of each year.

This form of membership is created to promote closer relations between members of the medical and dental professions throughout the world.

A.D.A. Centennial and F.D.I. Annual Meeting • Increasing interest is being taken by members of the profession in Great Britain in this joint meeting planned for September 12-20; there will undoubtedly be a large delegation of British dentists present in New York.

G. H. Leatherman,
DMD., F.D.S., R.C.S., F.A.C.D.

News from Australia

At the Annual Meeting of the Federal Council of the Australian Dental Association, held October 25 in Melbourne, Dr. Kenneth Adamson was re-elected president for a further term of two years.

In announcing the re-election of the president for a third term of office, Dr. A. Gordon Rowell, vice president, spoke of Dr. Adamson's tireless work for the welfare of the profession and of his devotion to duty, which was beyond the equal of that which could be expected of any individual.

Other office bearers elected at the Annual Meeting were: Dr. Rowell, vice president; W. Alan Grainger, interstate vice president; J. M. Wark, honorary secretary, and A. R. T. Greenwood, honorary treasurer.

W.H.O. DENTAL HEALTH SEMINAR

Arrangements for the Seminar to be held in Adelaide in February 1959, immediately prior to the 15th Australian Dental Congress, are now well in hand. As reported in our last Newsletter, at least 45 participants from the Western Pacific and South-East Asia countries are expected to attend. The latest bulletins received from the World Health Organization Office, Manila, indicate that participants from Australia, China, Eastern Mediterranean, Federation of Malaya, Fiji, French Polynesia, Hong Kong, Japan, Korea, New Zealand, Territory of Papua and New Guinea, Philippines, Sarawak, Singapore, South-East Asia, U. S. Trust Territory of the Pacific Islands, Vietnam, West New Guinea and Western Samoa have now been officially nominated.

AWARD OF HENRY BEYRON RESEARCH GRANT

It is with much pleasure that we announce the award of the Henry Beyron Research Grant to Roy W. Shepherd, D.D.Sc. (Melb.). Dr. Shepherd holds the appointment of Reader in Dental Prosthetics in the Dental School of the University of Melbourne, and his proposed research is to be an extension of work originally begun in 1954 which, at the present time, is confined mainly to cinematographic methods with a specially designed extraoral screen. It is the intention of Dr. Shepherd to extend the work already in progress to a much wider and more important field. At present he is abroad on sabbatical leave.

FLUORIDATION

At its Annual Meeting, mentioned earlier in this report, the Federal Council reaffirmed its support of the fluoridation of drinking waters and resolved that the Commonwealth Government be requested to provide financial support to State Governments for the fluoridation of water supplies on a national basis, as a positive step toward a nation-wide scheme for the reduction of dental caries.

For many years the Australian Dental Association has, through its Federal Office and State Branches, pressed for the fluoridation of communal water supplies, and has continued its support of this most important aspect of preventive dentistry despite opposition, some of which has come from unexpected quarters.

The National Health and Medical Research Council, the supreme advisory body in Australia on matters of public health, has passed two resolutions on fluoridation. The first was a general statement on the benefits to be derived from fluoridation, and the second a recommendation that each State Health Department set up an Advisory Committee to review, advise on and supervise proposals for the addition of fluoride to communal water supplies. In 1954, the Federal Council of the British Medical Association in Australia endorsed the resolutions of the National Health and Medical Research Council, which re-

affirmed, in May 1957, its previous decisions in regard to fluoridation.

In the paragraphs to follow is an outline of what has been done in the individual Australian States in an endeavor to create a more widespread interest in this most important subject upon which the general public has, on occasion, been so grossly misinformed.

In New South Wales, the Yass Municipal Council introduced a scheme in June 1956 whereby fluoride was added to the water supply. Since then two more Municipal Councils have voted in favor of the project. In 1957 an Act, known as the "Fluoridation of Public Water Supplies Act," was passed by water authorities and local government bodies, to regulate the fluoridation of water supplies. A Statutory Committee has been established under the Act and will advise municipal authorities on all aspects of fluoridation procedure.

Through the Queensland Branch of the Australian Dental Association, fluoridation has been actively promoted by way of the press and radio; and at the request of the Association the Queensland Health Council accepted it for one year as a project. Although several communities in Queensland have shown considerable interest in the subject, it has not yet been adopted there.

In South Australia no advisory panel on fluoridation has been set up, but representations have been made to the Advisory Council for Health and Medical Services in that State.

Fluoridation was adopted at Beaconsfield in Tasmania in 1953, and annual dental examinations are conducted in conjunction with the project. The Department of Health Services in Tasmania has undertaken to assist municipalities financially with the establishment of schemes for the fluoridation of public water supplies, and the matter is now being given serious consideration by the Hobart and Launceston City Councils.

In Victoria the Health Commission recommended fluoridation to the cabinet in 1955, on the findings of an advisory committee appointed by the Minister for Health, but since then no further action has been taken on a governmental level. The Victorian Branch of the Australian Dental Association, through its Dental Health Education Committee, has conducted campaigns in an endeavor to increase public appreciation of fluoridation. The Association of Apex Clubs has recently published a pamphlet on the "Facts of Water Fluoridation," and has been responsible for stimulating the interest of a number of towns in this project.

The Western Australian Branch of the Australian Dental Association has written articles for the press and distributed pamphlets on the subject, setting out the benefits to be derived from this measure and has established liaison with the W.A. Health Education Council and the water supply authorities in an effort to promote greater interest in fluoridation.

Despite such activity throughout the Commonwealth, it is disappointing to report that only a small percentage of the population in this country is receiving fluoridated water. Such projects are implemented through municipal authorities, and in Australia these authorities are restricted by two things: lack of funds and the fact that, on occasions, they can be extremely conservative. It would seem, however, that there is an increasing public interest in fluoridation, and although this has not been as great as we would wish, it is a positive indication that the efforts of the dental profession in this regard have not entirely been wasted.

Margaret Hjorth

the reader comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

DENTAL HEALTH TEAMS

It is gratifying to know that so significant and responsible an international organization as WHO regards dentistry as a subject for world health study. It is equally gratifying to learn that this special agency's Expert Committee on Auxiliary Dental Personnel has considered and recommended ways and means of relieving shortages in dental manpower, providing dental care where it is now sparsely or entirely unavailable, has suggested methods of emergency treatment and has stressed the importance of research in the field of preventive dentistry.

American dentistry applauds all efforts to spread adequate dental services to the peoples of the world. However, American dentistry, which over the years has developed a high standard of quality performance, must view with concern the Expert Committee's suggestion of the introduction of dental health teams consisting of "chairside assistants, dental technicians, dental hygienists and school dental nurses working under the direction and supervision of fully qualified dentists who assume the responsibility for the work."

The ardent desire to bring more dentistry to more people quickly may tempt administrators to adopt industrial assembly line technics and to assign purely dental functions to auxiliary personnel thus tending to water down the quality of dental service and to dismember the dental profession *per se*. A "dental health team" proposal in Massachusetts in 1949 was repudiated and rejected by the American Association of Dental Schools, the A.D.A. and the citizens of that state. Lifting this scheme on to a world level may add up to an unhappy end of a praiseworthy objective.

We hope that Shailer Peterson, who served as the United States member of the Expert Committee, and who knows the history of the Massachusetts project, has pointed up these dangers and temptations to the WHO committee.

Nathan Kobrin, D.D.S.
Brooklyn, N. Y.

SEMIRETIREMENT FOR DENTISTS

I am submitting a plan which may be helpful to members of the American Dental Association who are retired or are planning on retiring whereby they can keep themselves in useful and dignified employment on a parttime basis, thus avoiding the idleness which often besets retired persons who have been active all their lives.

Important as the $1,200 (allowable annual earned income in addition to Social Security benefits) may be to some retired dentists, it is far more important, as we all know, to keep occupied in some useful, interesting and responsible work.

The practical aspect of this program consists of two basic parts. The first is the creation of a bureau, council or department of the Association, wherein contact or liaison is made for

retired members with would-be employers. Employers could be found in:

1. Dentists in private practice.
2. Dental colleges.
3. Educational institutions.
4. U. S. Public Health Service.
5. Local or state health departments.
6. Industrial organizations with health departments.
7. Veterans' organizations.
8. Research organizations.
9. Pharmaceutical companies.
10. Miscellaneous sources which may be known to other members.

The great prestige and respect that the American Dental Association commands should induce potential employers to cooperate with such a council.

Secondly, a program of repetitive publicity in THE JOURNAL in a section titled "Employment for Retired Dentists," or "Geriatrics for Dentists," or a similarly descriptive title, inviting suggestions from reader members.

I am really at a loss to make satisfactory plans for my own retirement. I am inclined to think that there are many other dentists in the same predicament. Hence I feel it would be advantageous for others as well as myself to pool our knowledge and experience and study the best methods of procedure.

I do not believe a hobby is enough for a dentist in retirement; at least, not for me. I know I would be happiest in employment connected in some way with our profession. (I have practiced general dentistry for 42 years and am a Life member of the Illinois State Dental Society and the Chicago Dental Society.) My reason for writing to the A.D.A. is that this plan would have to be national in scope to be effective.

Should a plan such as this ever be adopted I would gladly offer part of my time, services, and meager knowledge in the attempt to make it successful. I would be interested in learning of the reactions to this idea of other Association members who are approaching the retirement age.

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PERIODONTAL DISEASE OR CARIES RESPONSIBLE FOR LOST TEETH?

Every writer should stop from time to time in order to check on himself. Careless generalizations and looseness with facts must be consciously avoided if the writer's responsibility to the reader is to be met. In "Suggestions on preparation of medical papers," (J.A.M.A. 155:1573, 1954), Selma DeBakey states it as follows:

"With the subject clearly delimited and the purpose of the paper specifically in mind, the physician should next carefully examine the medical literature not only to determine whether the material has already been presented but also to familiarize himself with pertinent data that have already been published."

In the November issue of THE JOURNAL, an article by James R. Cameron, "New horizons in dentistry," contained the following statement: "Experienced dentists will agree that periodontal disease is responsible for the loss of more teeth than is caries or alveolar abscess."

What are we to think, then, when we read the results published by Harold W. Krogh in the same issue of THE JOURNAL, in the article entitled "Permanent tooth mortality: a clinical study of causes of loss"? A portion of Dr. Krogh's summary follows:

"Approximately 40 per cent of the total tooth loss was caused by dental caries, and 20 per cent by periodontal disease. Prosthetic reasons accounted for 20 per cent of the teeth lost.

"On a cumulative basis, dental caries exceeded periodontal disease as cause of permanent tooth mortality in each decade of life up to ages 60 to 69. However, as might be expected, losses because of dental caries tended to occur at earlier ages than those from periodontal disease."

Moreover the article cites an investigation by E. F. Allen published in 1944 which ". . . analyzed the causes of extraction of 1,424 teeth from 353 patients at the University of Michigan Dental School clinic. Caries accounted for the loss of 48.8 per cent of the teeth, periodontal disease for 40.7 per cent, and only 2.8 per cent were lost for prosthetic reasons."

No criticism of Dr. Cameron's paper is intended. I do feel, however, that the sentence "Experienced dentists will agree that periodontal disease is responsible for the loss of more teeth than is caries or alveolar abscess," is incomplete and therefore unfair to the reader, as it leaves him with a definite misconception. It seems to me that accuracy is of primary importance in any article appearing in a professional journal.

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Association launches Science Fair program for Centennial

Four awards in dental science will be presented by the American Dental Association at the 10th National Science Fair to be held May 6-9, 1959, in Hartford, Conn. The cooperation of the Oral B Company, of San Jose, Calif., has enabled the Association to initiate its science fair program on a national basis at the beginning of the Centennial year.

The awards will go to the high school students whose exhibits are judged to be outstanding in the fields of dental and allied sciences.

The judges, to be designated by the Association, will select the winning exhibits from the several hundred entries included in the National Science Fair.

The top two award winners will receive an expense-paid trip to the Centennial Session of the Association in New York, September 14-18, 1959, to display their exhibits in the Scientific Exhibit. The winners of the two second-place awards will each receive a $50 certificate toward the purchase of scientific equipment or books of their choice.

The National Science Fair is an annual event in which exhibits selected from thousands of high school fairs are displayed by successful finalists. The winners of local high school fairs participate in state or regional fairs, and only the top projects from these expositions proceed to the National Science Fair.

The development of the Association's science fair program was authorized by the House of Delegates in 1957. In urging dentistry's active participation, the House emphasized that support of science fairs is of essential importance to the Association's research and educational programs in the coming years.

The science fair movement offers a ready mechanism for developing nationally a keener public recognition of the scientific aspects of the dental profession. It presents an exceptional opportunity for direct public relations activity.

It can be a further means of demonstrating the great opportunities that exist within the framework of a career in dental science and dental practice.

The Association's Awards Program will operate on the following principles:

AWARDS

1. *First award:* Two finalists will receive an expense-paid trip to the Centennial Session of the Association in New York, September 14-18, 1959, to display their winning exhibits in the Scientific Exhibit.

2. *Second award:* Two finalists will receive an award of $50.00 each toward the purchase of scientific equipment.

3. All four winning finalists will receive an encomium in the form of a certificate of recognition for developing a project of outstanding interest on a scientific subject related to dentistry.

JUDGING OF EXHIBITS

1. To qualify for eligibility in the American Dental Association Awards Program, the exhibits must be on a subject closely related to dental science, dental technology or allied disciplines.

2. The evaluation of exhibits which qualify will be based on the "Criteria for Judging the National Science Fair," as described in the National Science Fair Sponsor Handbook for 1959, page 14, published by Science Service.

3. The judges will be selected by the Association, and will work in cooperation with the Director of the National Science Fair.

BOOKLET

A new booklet, *Dental Projects for High School Science Students,* is being produced for the Association by Science Service, the institution for the popularization of science. The booklet contains detailed outlines for more than a dozen projects in oral anatomy, chemistry, bacteriology, dental materials and technology. It tells the student and teacher how to obtain assistance from individual dentists and their organizations.

Publication of the brochure was made possible through a generous gift of $3,000 from the Oral B Company, San Jose, Calif., in recognition of the Association's 100th anniversary. This contribution has permitted Science Service to send a copy of the booklet to 21,000 science fair leaders across the United States and other participating countries.

Copies of the brochure and practical suggestions for developing science fair programs at the community level have been mailed to all constituent and component dental societies and associated professional organizations.

Requests for additional copies should be directed to Science Service, 1719 N St., N.W., Washington 6, D.C. The price schedule is 25 cents each for single copies, or 20 cents each for quantities of ten or more, postpaid; remittance should be enclosed with order.

Moscow polyclinic visited

Milo Danzeisen, D.D.S., Toledo, Ohio

A visit to a Moscow polyclinic was the highlight of a visit which I made to Russia last summer. A nurse from Columbia University and myself had the opportunity of visiting this type of public health dispensary only after repeated requests to the Intourist people (the Russian Tourist Agency).

We were officially received by the head physician, Dr. Petropavlovski, a dentist, Dr. Asner, and a nurse. They were extremely cordial to us and seemed to be pleased that we were visiting their clinic.

The clinic corresponds to a public health dispensary and includes many departments. These include internal medicine, neurology, eye, ear, nose and throat, dermatology, radiology, physiotherapy, gynecology and stomatology (dentistry). However, this clinic has no facilities for hospitalizing patients nor does it accept children as patients.

Moscow has over 100 of these clinics distributed throughout the city. The one we visited is one of the newer ones, opened in 1955, and is probably one of the largest in the city. On an average day the clinic handles between 1,500 and

Fig. 1 • Two laboratory technicians are busy polishing dentures in a Moscow polyclinic

Fig. 2 • A Russian dentist and her assistant prepare to insert a partial prosthesis

Fig. 3 • At Polyclinic no. 3 in Moscow last summer, were (l. to r.): Boris Petropavlovski, head physician and superintendent of the clinic; Miss Naumenko, head nurse; Milo Danzeisen, American dentist and author of the accompanying article, and Joseph Asner, chief dentist of the clinic

2,000 patients. The staff includes 160 physicians of whom only ten are men. Of the 26 dentists, three are men.

Our guide emphasized the point that "everything is free at the clinic," but the patient must pay for medicine and drugs.

Dentistry is a specialty of medicine in the Soviet Union and requires additional training. Dr. Asner's education is described as follows:

1. Ten years of primary schooling—equivalent to our 12 years.

2. Five years of college, with graduation as a general practitioner of medicine.

3. Two years of specialization in stomatological work. This may take some students three years if they do not pass the required tests.

Dr. Asner works six days a week, five and a half hours a day. Occasionally he must work overtime and for this he receives extra pay. His regular salary is 1,600 rubles a month.

The chief dentist, with our guide serving as interpreter, led me on a tour of the dental clinic. They had separate rooms for radiology, diagnosis, surgery, operative, prosthetics and laboratory. The radiology room had the proper lead shield and appeared to be adequate. The diagnosis room had three chairs with few instruments and I considered it to have only the bare necessities compared to our standards.

No surgery was being performed at the time of my visit, but from my observations the room had limited equipment. I saw only one set of surgical forceps and one cabinet for supplies. The room was extremely clean, however.

The operative room impressed me as being very functional but limited in facilities. The dentists had few instruments and medicaments in their cabinet. Dr. Asner explained that the dental units had rpm of between 3,000 and 5,000, but that the Russians do have some that are in the high speed range of over 50,000 rpm which were not located in this clinic. Silicates, cements and amalgams were the materials used in restorations and I did not see any gold work. Upon request, a dentist prepared a mix of amalgam. The preparation was somewhat unusual in that it was washed with ammonia. The mixing was performed with a mortar and pestle and I didn't see any mechanical amalgamators in the room.

Prosthetics appeared to be the busiest department that morning. One dentist was preparing an upper arch for a partial denture by seating several steel crowns on the abutment teeth. I did not see any gold being used in the prosthetic department either. Another dentist was inserting a partial prosthesis which was constructed of acrylic resin with metal clasps as direct retainers.

This was the only type of partial prosthesis I saw constructed. They apparently do not use any Ticonium or other metal for the framework of a partial prosthesis in this clinic. The third dentist in this department was taking denture impressions with plaster. She was using plaster for a final upper complete denture impression and also for a lower partial denture impression. I did not see any alginate type of impression material in the clinic.

The laboratory had approximately 15 people working in two separate rooms. The first was for the curing of acrylic resin dentures. I did not observe any material other than plaster being used as the matrix for the curing process. The second room was for the articulation, setting of teeth and waxing of dentures. Again, gold work was conspicuously absent from the workbench and also from any type of fixed bridges.

In summary, I was definitely impressed by the cleanliness of their clinic and the friendliness of the staff. From this short visit, I would judge their work and facilities to be somewhat below our standards in a comparable clinic in the military services or in public health.

We had many other interesting trips and experiences while in Moscow and Leningrad which I have not described here because they do not pertain to dentistry. However, I should like to repeat a remark our guide, a young girl of 20, made just before we left. She said she knew I was a United States Army Officer and then asked, "Why do you want to kill all of these Russians?"

424 West Woodruff Street

School Education and Self-Education • For most Americans the end of formal schooling does not mean the beginning of self-education throughout maturity. Therefore adult education is looked upon by many as a kind of "making up," an activity mildly embarrassing for one's self, usually good for somebody else. Yet education because of its very nature, which derives from the dynamic nature of life, must be continuing, else it is not education. The human being is not static. . . . A person is not educated unless he assumes command of his own growth; he ceases to be educated when he relinquishes this command. Fully to be a human being is ever to be discovering, creating, growing. History is not static. If it ever was possible to learn in youth all that would be needed for the rest of life, it certainly is not possible in modern times, when the only constant is the constant acceleration of change, when demands upon people multiply, their opportunities are opened and their life spans lengthened. Ceaseless curiosity is the mark, not of deficient schooling, but of a vital mind. The systematic development of one's understanding through continuing education is an activity for mature men and women who appreciate the fact that only in a free society do people educate themselves liberally, and only through liberally educated adults is a free society possible. *C. Scott Fletcher. Continuing Liberal Education.*

Comments on the revision of NCRP Handbooks

Robert J. Nelsen, D.D.S., Rockville, Md.

The National Committee on Radiation Protection (originally known as the Advisory Committee on X-ray and Radium Protection) was formed in 1929 upon the recommendation of the International Commission on Radiological Protection. The Committee is sponsored by the National Bureau of Standards and governed by representatives of participating organizations. Eleven subcommittees have been established, each charged with the responsibility of preparing protection recommendations in its particular field. The reports of the subcommittees are approved by the Main Committee before publication.

The radiation protection recommendations of the NCRP are published in the form of *Handbooks*. Of particular interest to dentists are Handbook 59, *Permissible Dose from External Sources of Ionizing Radiations;* and Handbook 60, *X-Ray Protection*. Both handbooks are now being revised by their respective subcommittees of the NCRP.

The following statements of particular interest to dentists are excerpted from a recent Addendum to Handbook 59.

On January 8, 1957, the National Committee on Radiation Protection and Measurements issued a Preliminary Statement setting forth its revised philosophy on Maximum Permissible Radiation Exposures to Man.[1] Since that time several of the NCRP subcommittees have been actively studying the necessary revisions of their respective handbooks. These studies have shown the need for (1) clarification of the earlier statement and (2) modification or extension of some of the concepts in that statement. Furthermore, the International Commission on Radiological Protection has made minor changes in their recommendations. Accordingly the NCRP has prepared a set of guides that will assure uniformity in the basic philosophy to be embodied in the various handbooks.

Since the statement of an average per capita dose for the whole population does not directly influence the substance of the NCRP Handbooks, no further statements regarding such a number will be made at this time. In any discussion of the MPD[2] it is impractical to take into consideration the dose from natural background and medical or dental procedures.

The changes in the accumulated MPD are not the result of positive evidence of damage due to use of the earlier permissible dose levels, but rather are based on the desire to bring the MPD into accord with the trends of scientific opinion; it is recognized that there are still many uncertainties in the available data and information. Consideration has also been given to the probability of a large future increase in radiation uses. In spite of the trends, it is believed that the risk involved in delaying the activation of these recommendations is very small if not negligible. Conditions in existing installations should be modified to meet the new recommendations as soon as practicable, and the new MPD limits should be used in the design and planning of future

Official representative of the American Dental Association to the National Committee on Radiation Protection.

1. NBS Tech. News Bul. 41:17 Feb. 1957.

2. The quarterly limitation of 3 rems in 13 weeks is basically the same as in H59 except that it is no longer related to the old weekly dose limit. The yearly limitation is 12 rems instead of the 15 rems as given in the NCRP preliminary recommendations of January 8, 1957.

apparatus and installations. Because of the impact of these changes and the time required to modify existing equipment and installations, it is recommended on the basis of present knowledge that a conversion period of not more than 5 years from January 1957 (see footnote 1) be adopted within which time all necessary modifications should be completed.

GUIDES FOR PREPARATION OF NCRP RECOMMENDATIONS

The risk to the individual is not precisely determinable but, however small, it is believed not to be zero. Even if the injury should prove to be proportional to the amount of radiation the individual receives, to the best of our present knowledge, the new permissible levels are thought not to constitute an unacceptable risk. Since the new rules are designed to limit the potential hazards to the individual and to the reproductive cells, it is therefore, necessary to control the radiation dose to the population as a whole, as well as to the individual. For this reason, maximum permissible doses are set for the small percentage of the whole population who may be occupationally exposed, in order that they not be involved in risks greater than are normally accepted in industry. Also radiation workers represent a somewhat selected group in that individuals presumably of the greatest susceptibility (i.e., infants and children) are not included. However, for the persons located immediately outside of controlled areas but who may be exposed to radiation originating in controlled areas, the permissible level is adjusted downward from that in the controlled area because the number of such persons may not be negligible. With this downward adjustment, the risk to the individual is negligible so that small transient deviations from the prescribed levels are unimportant.

Controls of radiation exposure should be adequate to provide reasonable assurance that recommended levels of maximum permissible dose shall not be exceeded. In addition, the NCRP reemphasizes its long-standing philosophy that radiation exposures from whatever sources should be as low as practical.

BASIC RULES

1. Accumulated Dose (Radiation Workers).

A. *External exposure to critical organs.*

Whole body, head and trunk, active blood-forming organs, or gonads: The maximum permissible dose (MPD), to the most critical organs, accumulated at any age, shall not exceed 5 rems multiplied by the number of years beyond age 18, and the dose in any 13 consecutive weeks shall not exceed 3 rems.[2]

Thus the accumulated MPD=$(N-18) \times 5$ rems, where N is the age in years and is greater than 18.

COMMENT: This applies to radiation of sufficient penetrating power to affect a significant fraction of the critical tissue. (This will be enlarged upon in the revision of H59.

B. *External exposure to other organs.*

Skin of whole body: MPD=10 (N–18) rems, and the dose in any 13 consecutive weeks shall not exceed 6 rems.

COMMENT: This rule applies to radiation of low penetrating power. See figure 2, H59.

Lens of the eyes: The dose to the lens of the eyes shall be limited by the dose to the head and trunk (A, above).

2. Emergency Dose (Radiation Workers).

An accidental or emergency dose of 25 rems to the whole body or a major portion thereof, occurring only once in the lifetime of the person, need not be included in the determination of the radiation exposure status of that person (see p. 69, H59).

3. Medical Dose (Radiation Workers).

Radiation exposures resulting from necessary medical and dental procedures need not be included in the determination of the radiation exposure status of the person concerned.

4. Dose to Persons Outside of Controlled Areas.

The radiation or radioactive material outside a controlled area, attributable to normal operations within the controlled area, shall be such that it is improbable that any individual will receive a dose of more than 0.5 rem in any 1 year from external radiation.

11. For the vast majority of installations (medical [dental] and industrial), operation is more or less routine and reasonably predictable and it may be expected that their monitoring procedures will be minimal. For such installations the protection design should be adequate to insure that over-exposures will not occur—otherwise frequent sampling tests should be specified. Where film badges are used for monitoring, it is preferable that they be worn for 4 weeks or longer, since otherwise the inaccuracy of the readings may unduly prejudice the radiation history of the individual. Where operations are not routine or are subject to unpredictable variations that may be hazardous, self-reading pocket dosimeters, pocket chambers, or other such devices should also be worn and should be read daily or more often as circumstances dictate.

Route 2, Great Falls Rd.

reports of
councils
and bureaus

Legislative activities of The Independent Dental Laboratories Association (an Illinois corporation)

COUNCIL ON DENTAL TRADE AND LABORATORY RELATIONS

The Independent Dental Laboratories Association, an organization representing the self-styled "public denturists," secured an audience on September 17, 1958, with the Illinois Medical Practice Act Commission, a legislative committee of the Illinois General Assembly. At the September 17 hearing Mr. Maxwell E. Potts, a director of The Independent Dental Laboratories Association, presented the statement which is reproduced herewith verbatim.

STATEMENT OF INDEPENDENT DENTAL LABORATORIES ASSOCIATION
to
ILLINOIS MEDICAL PRACTICE ACT COMMISSION
presented by:
M. E. Potts
September 17, 1958

We, the members of the Independent Dental Laboratories Association of Illinois, first want to express our appreciation to the Members of the Commission for granting us this time. We believe a serious injustice is being done to members of the Public who require removable type dentures, either complete or partial, and we, who make and repair them, are grateful for this opportunity to be heard. It is our objective in appearing before you to try to convince you:

1. That we are better qualified to make or repair full and partial removable dentures than any other persons in the State of Illinois.
2. That it is neither necessary nor reasonable that we should be restricted to the control of any other group while engaged in the making or repairing of restorations.
3. That the practice of dentistry and denturistry are two separate services to the Public, easily distinguishable and neither dependent upon the other.

4. That the Public interest will best be served in the field of removable restorations if we may be permitted to serve the members of the Public direct when either a dentist or a person licensed to engage in the unlimited practice of medicine in the State of Illinois, has solved all the problems of oral and dental health in each case, and dental restorations are indicated.

- 1 -

Colleges of dentistry devote about 14 semester quarter hours of classroom work to prosthetics, while denturists require a minimum of ten thousand hours of practical application of this mechanical art in a well-equipped laboratory, under supervision of a qualified denturist. In other words, dentists are expert in the preservation and surgical removal of the natural teeth and the treatment of the gums, rather than the designing and making of false teeth. The average dentist does not design and make false teeth, but the dentists, through legislation, have been placed in an economic position where they receive all the income from the work they do, and two-thirds of the income from all the work we denturists do.

A denturist is a thoroughly trained, professional, designer of dental plates. His training and experience include all the skills of the dental laboratory technician. In addition, and unlike the laboratory technician, the denturist is a qualified expert, usually having his own laboratory and technicians, who maintains a direct association with the wearer or user of dental plates, similar to those who provide other prosthetic devices such as artificial limbs, artificial eyes, hearing aids, glasses, and other prosthetic anatomical replacements.

- 2 -

Under the law we are restricted by the control of the dentist. They do not supervise the methods, procedures, equipment or materials in any laboratory procedure. The privilege of restricting our activities, therefore, apparently, is not in any way related to the adequacy of our finished product and, therefore, does not benefit the general public.

Apparently, the practicing dentists recognize our ability, which is evidenced by the very fact that they have dental laboratories make more than 95% of restorations. This, we think, is due primarily to the fact that the dental schools do not devote enough of their curriculum to the study of making restorations to permit them to be experts in the field.

- 3 -

DENTISTS: To members of the dental profession, the Statutes of Illinois represent a substantial, economic windfall. It would be unusual if they did not vigorously oppose any change.

Although by their own admission, less than 5% of these dentures are made by dentists, the present Statutes permit them to make a substantial profit on every denture, full or partial, and every denture repair done in this State.

Furthermore, sales of dentures by dentists, are exempt from the sales tax, being considered as a professional service, when actually, the transaction consists of the sale of a commodity.

In cases of repairs, the dentist quite often never sees the purchaser, but is well paid by consenting to permit a laboratory to do the work directly for the purchaser. The amount dentists charge for having their assistants give this consent to laboratories varies, but frequently it is more than the laboratory charges for doing the work.

In the case of full or partial removable dentures, dentists furnish the impressions and bite and send them to the laboratory. The laboratory, in turn, makes the dentures without any supervision by the dentist. The dentist then presents the finished product to the purchaser. Members of the public have no choice in determining which laboratory makes his or her teeth.

For this middle-man service, the dentist normally charges three times as much as he pays the denturists for doing all of the constructive work involved, and the net result is seldom as satisfactory as it would have been had the wearer dealt with the denturist.

One of the principal reasons dentists do not personally make or repair dentures is because they realize they are not qualified to do the job as expertly as are denturists. Their lack of qualification stems primarily from the fact that their educational program does not include sufficient experience in the art of making dentures.

DENTURISTS: As previously stated, there are no provisions under the Illinois Statutes for the training, proficiency, expertness, registration, licensure or examination of persons who make or repair false teeth; however, we who engage in this business, find through experience, that a minimum of five full years of training, plus at least one additional year of related study—all of which consists of 10,000 hours of laboratory work under the supervision of an experienced denturist—is required to become proficient and qualified to make dental plates.

In fact, the Dentist Supply Company of New York, one of the largest suppliers in the world, has recently announced a course of

study classes for mechanics in laboratory procedure. A specific requirement in order to attend these classes is: A mechanic or technician must have a minimum of at least five years or more of full denture work and a minimum of at least two years in arrangement and articulation of teeth. These requirements would disqualify most dentists from taking the course.*

This, obviously, indicates that this particular supply house feels that no one with lesser qualifications than those set forth can do justice to the use of their supplies.

We contend that the fields of activity in which dentists and denturists properly engage, are not in any way in conflict. We make more than 95% of the dentures. Ours, while in the main a mechanical art, deals with the welfare of the user or wearer of these mechanical devices.

It is our hope that requirements for denturists may be set up by Statutes for licensure, as has been done in so many other fields affecting public welfare, i.e. barbers, beauticians, electricians, plumbers, doctors, dentists, lawyers, etc., which are examples of present Statuatory requirements for licensure by law to protect the public interest.

Dentistry ends where denturistry begins, but there are presently no Statuatory lines of demarcation. Denturistry should be defined and recognized by Statute, and definite requirements set forth so as to clearly establish the qualifications of denturists. This would be a great contribution to the public welfare in the elimination of ill-fitting dentures, exhorbitant prices, poor service, and a deplorable waste of time.

Dentists do not have the time, the facility, or in most cases, the training to make this service available as it should be.

- 4 -

THE PUBLIC

We feel that the Public is entitled to the very best service available in this and every other field, at the most economical price. It seems that the most important factors to a person requiring dentures are: (1) The most satisfactory job possible. (2) The cost. (3) Time consumed in obtaining said dentures.

(1) The only way to provide the most satisfactory restoration is to be able to see the subject matter, or purchaser. We cannot properly make restorations for persons we cannot see. For all practical purposes, under the Statutes, we are not permitted to see our ultimate wearer or user of the dentures we make for them.

(2) Cost: It is a fact, and easily provable by us, that were it possible for the denturists to make restorations directly for members of the Public, the cost to the purchaser would be decreased at least 50%.

Based on surveys by the American Dental Association, statistics indicate that more than 65% of the people who are in need of dentures do not get them. Obviously any decrease in cost will result in an increase in the number of folk who will be able to get dental plates. Ordinarily wearers of false teeth pay about four times as much to obtain them as is received by the dental laboratories who furnish 95% of the materials required, and who do 90% of the work involved in making the dentures.

Because of the indirect nature of the transaction, which brings about the necessity of the false teeth making at least six trips back and forth from the dentist to the laboratory, and which travel consumes on the average of seven days, the purchaser quite often is deprived of his or her income for that period of time.

On the other hand, when it becomes possible under the Statutes for the denturists to serve purchasers directly, only one day's time is required to provide a complete and satisfactory restoration. The savings to the members of the Public in time and money obviously will be tremendous when this grave injustice is corrected and the Statutes of the State permit denturists to make dental plates directly for the Public.

(3) Time consumed: It only follows that the innumerable trips to the dental office required to get a set of dentures is making the cost of this restoration work prohibitive to the average income group. Anyone less than average is completely without this service. Certification of the purchasers' oral health and proper authorization of this work by a dentist or person licensed to unlimited practice of medicine, to a qualified denturist's office, would eliminate this great waste of time. The present set-up is causing many purchasers to go from dental office to dental office in trying to obtain comfortable, well-fitting restorations.

GUARANTEE

This is a commodity item of mechanical manufacture, and should have a reasonable

*Editor's Comment • H. M. Thornton, president of The Dentists' Supply Company of New York, disavowed this statement in the following telegraphic communication: "Re statement of Independent Laboratory Association presented to Illinois Medical Practice Act Commission September 17 referring to Dentists' Supply Company laboratory courses, please advise those concerned that this reference is taken out of context and the conclusions drawn do not represent the attitude or position of Dentists' Supply Company. Any licensed dentist is qualified to attend these classes and is welcome to attend them. Many have already done so."

margin of guarantee. Ill-fitting teeth prevent proper mastication effects the personality, and, consequently, cause self-consciousness and embarrassment; thus, adversely affecting the general welfare of the wearer. Many digestive disorders may be contributed to ill-fitting mechanical substitutes or dentures. Purchasers of removable dentures should, like purchasers of artificial limbs, eyes, hearing aids, glasses, etc., be entitled to have the work reasonably guaranteed.

Under the present Illinois Statutes this added protection to the Public is an impossibility. A dentist will not generally guarantee work he does not do, and we are unable to guarantee work we cannot properly fit because we cannot see the purchaser. The Public cannot escape the misfits that follow, because of these elements.

SHORTAGE OF DENTURISTS

Lack of proper recognition of persons making false teeth has already created a situation that will develope into an acute shortage of dental mechanics if and when the time comes that more persons who need dentures, get them.

Statistics show that the average age of persons in the field of denturistry is over 46 years. Young men are inclined to get into fields of endeavor that will reward them most. People are naturally hesitant to devote six full years to learning and training in this field when it carries but little reward for expertness. We are completely subservient to dentists under Illinois Statutes, and subject to their slightest whim. While we can prove our qualifications, we are not permitted that opportunity. No other calling is so completely circumscribed. No where in the realm of American business does a comparable MASTER-SERVANT relationship exist.

SECOND RATE CITIZENS

We are denied the basic freedom to make to society, the contribution commensurate with our abilities. Although it requires approximately as much time and native ability to become an accomplished denturist as it does to become a dentist or a lawyer or an accountant, the existing Statutes make of us, second rate citizens.

We cannot establish and run our businesses without being subjected to complete domination and control of those who have no investment in time or money or otherwise, in us. We are in a position today, similar to that of the dentists many years ago when they sought to bring some recognition to their profession. We are being deprived of the right to earn the livlihood of which we are capable, to earn the respect and admiration of those we are able to serve, and to play a part in building a better State and Nation by contributing in the fullest sense to the welfare of the People.

SUGGESTED SOLUTION

We entertain no desire to engage in the practice of dentistry. We do not claim to be qualified to protect the oral health of persons. That, in its entirity is properly within the sole province of dentists, or persons who have proven their qualifications to engage in the unlimited practice of medicine.

We do feel, however, after extractions have been made and the hazards associated with bad oral health have been completely dealt with, then and only then, do we desire to be permitted to make or repair dentures directly for the Public.

You members may well ask how we will know that the point of good oral health has been accomplished.

We suggest to you that the Statutes should require us to limit our direct services to instances where the would-be purchaser of our services has a certification of satisfactory oral health for the making of dentures—said certification made by either a licensed dentist or a professional person licensed in the unlimited practice of medicine in this State.

We can presently conceive of no better way to give members of the Public the best that all of us have to offer.

On October 8 representatives of the Illinois State Dental Society informed the Commission of the common viewpoint of the dental profession and the ethical dental laboratory group on the "suggested solution" proposed by Mr. Potts. Speaking as a representative of the Illinois State Dental Society, Mr. Joseph E. Kennedy, a past president of the Illinois Dental Laboratory Association and currently a member of the N.A.D.L. National Board for Certification, made the following comments:

The dental laboratory craft in this country is united in its purpose and objectives. It recognizes the dangers to public health involved in laboratories working direct for the public, and for reasons born of experience, it is unalterably opposed to such practices.

We advocate an even closer relationship with the dental profession as an essential auxiliary, rather than promote a cleavage between the two groups.

We recognize and acknowledge the fact that public health can be protected only when complete responsibility for any appliance placed in the human mouth rests with the person trained and skilled in dental medicine—the licensed dentist.

The statement of The Independent Dental Laboratories Association is presented in THE JOURNAL with a view toward alerting the members of the dental profession to the arguments offered by the so-called "public denturists" in their efforts to gain legislative support for direct dealings with members of the public. Additional information on the legislative activities of the Independent Dental Laboratories Association will appear in a subsequent issue of THE JOURNAL.

Expansion of benefits under Association group insurance programs

COUNCIL ON INSURANCE

In keeping with its responsibility to develop plans for insuring the members of the Association, the Council devoted a considerable amount of attention during the past year to an analysis of the effectiveness of the two group insurance programs currently sponsored by the Association. These are the Group Life Insurance Program, written in The Great-West Life Assurance Company, and the Group Accident and Health Insurance Program, carried in the National Casualty Company of Detroit through the agency of M. A. Gesner, Incorporated.

As a result of this study, the Council became convinced that a greater measure of service would be provided by the insurance programs if the benefits available could be increased. Accordingly, the underwriting companies were requested to submit suggestions for revising the programs for consideration by the Council. The proposals submitted were found to be highly satisfactory and their approval was recommended to the Board of Trustees by the Council. At its September meeting, the Board approved the recommended increase in benefits under the two programs to become effective January 1, 1959.

GROUP LIFE INSURANCE PROGRAM

The benefit and premium schedule in effect since January 1, 1956, under the Group Life Insurance Program is illustrated in Table 1.

The new benefit and premium schedule effective January 1, 1959, appears in Table 2.

The Council believes that the doubling of the basic death benefit will enhance

Table 1 • Benefit and premium schedule in effect since January 1, 1956 under Group Life Insurance Program

Age group	Basic death benefit	Total including accidental death benefit	Annual premium
Up to 30	$10,000	$20,000	$30.00
31 to 40	10,000	20,000	50.00
41 to 50	10,000	20,000	80.00
51 to 60	10,000	20,000	130.00
Renewal only—reducing amount of insurance			
61 to 75	9,000 to 3,000	9,000 to 3,000	150.00

the attractiveness of the program and result in a significant increase in membership participation in the program. This belief is based in part on the encouraging rise in the number of members enrolled in the plan since the benefits were increased from $5,000 to $10,000 in 1956. Approximately 8,000 members have been added in the three years that have passed since that 1956 increase, raising the total enrollment in the program to 22,000 members.

Members currently enrolled in the life insurance program will be afforded, individually, an opportunity to accept or reject the increase in benefits when their 1959 premium falls due. Those who accept will automatically be covered for the higher benefits by paying the new higher premium. They will not be required to furnish proof of their insurability. The insurance of those who choose to reject the increase will continue at the present benefit level. Should they subsequently desire to purchase the higher benefits, proof of insurability will have to be furnished. An exception to the latter requirement will be made for undergraduate student members who will have three years following graduation in which to apply for the higher benefits without being required to furnish proof of insurability.

Future enrollees in the program, with the exception of undergraduate student members, will be able to purchase only the higher benefits. Undergraduate student members, as the table indicates, will have the option to purchase either the $10,000 or the $20,000 basic benefit. The Council believes that retaining the availability of the $10,000 benefit for dental students will prevent any possible diminution in the attractiveness of the program for students and ensure the preservation of its stature as one of the most effective inducements for student membership in the Association.

GROUP ACCIDENT AND HEALTH INSURANCE PROGRAM

Since the Group Accident and Health Insurance Program was qualified in 1954, the peak monthly benefit available has been $400. Although well over 20,000 members of the Association are covered by the plan, the Council believes that it will be even more attractive under the new benefit schedule. Table 3 illustrates the modification in benefits and premiums under the Group Accident and Health Insurance Program.

Table 2 • New benefit and premium schedule under Group Life Insurance Program, effective January 1, 1959

Age group	Basic death benefit	Total including accidental death benefit	Annual premium
Undergraduate students	$10,000 or 20,000	$20,000 or 30,000	$30.00 or 60.00
Up to 30	20,000	30,000	60.00
31 to 40	20,000	30,000	100.00
41 to 50	20,000	30,000	160.00
51 to 60	20,000	30,000	260.00
Renewal only—reducing amount of insurance			
61 to 75	18,000 to 6,000	18,000 to 6,000	300.00

Table 3 • Modification in benefits and premiums under Group Accident and Health Insurance Program

Plan	Monthly benefits	Accidental death benefits	Dismemberment benefits	Semi-annual rates			
				Ages up to 50	Ages 50 to 60	Ages 60 to 65	Ages 65 to 70
			Current				
A	$100.00	$3,000.00	$ 5,000.00	$16.05	$18.30	$22.80	$26.30
B	200.00	3,000.00	10,000.00	30.15	34.65	43.65	50.65
C	300.00	3,000.00	15,000.00	44.25	51.00	64.50	75.00
D	400.00	3,000.00	20,000.00	58.35	67.35	85.35	99.35
			New				
E	500.00	3,000.00	20,000.00	71.95	83.20	105.70*	
F	600.00	3,000.00	20,000.00	85.55	99.05	126.05*	

*Only participating members who purchase the higher benefits prior to attaining age 60 would be entitled to carry these benefits at age 60 and beyond. The premium shown is for such renewals only. Renewal rates do not change on attainment of age 65.

Members currently participating in the accident and health program who desire to purchase the higher monthly benefits will be required to execute a new application in order to establish their insurability. Recent graduates and recent separatees from military service, who are physically impaired, can be accepted as impaired risks if application is made within 60 days of acceptance to active membership and entry into active practice. The benefits obtainable by such impaired risks, however, will continue to be limited to $200 per month.

All active, life and student members, under age 60, are eligible to apply for coverage under the Group Life Insurance Program. All active and life members, under age 70, who are actively engaged in the duties of their profession, are eligible to apply for coverage under the Group Accident and Health Insurance Program except members of the constituent societies of New York, New Jersey, Nevada, Utah, California and Southern California. Applications for both programs can be obtained from the Council by writing to the Central Office of the Association at 222 E. Superior St., Chicago 11.

The ILWU-PMA dental program: first year statistics VI. The individual tooth

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

One aspect of dental disease that has not been studied extensively is the differences that exist among the 32 permanent teeth, and among the 20 deciduous teeth, in susceptibility to dental disease. These differences have often been observed but seldom measured.

In this study of the first year of the ILWU-PMA dental program, those dental services ordinarily provided for a specific tooth were recorded by tooth number. The resulting data indicated that there were no significant differences between any tooth in the right quadrant and its counterpart in the left quadrant in number of dental services received. In many instances, however, significant differences were found to exist between upper teeth and comparable lower teeth. The tables in this chapter, therefore, present separate statistics for upper and lower teeth, but combined statistics for the two comparable teeth in the same jaw.

The "average" presented in the tables in this chapter was calculated by dividing the total number of services provided for the specified teeth by the total number of patients. The tables in this chapter include treatment provided in the initial treatment series only.

The extent to which molar teeth are more susceptible than other teeth to dental decay in childhood is shown in Tables 30, 31, 32 and 33. Of the deciduous teeth, second molars required the most fillings, an average of 1.03 per child for all age groups combined. The figure was highest at ages 5 and 6, at which age the average child received 2.17 fillings in his four deciduous second molars, including .75 one-surface and 1.42 multiple-surface fillings.

Deciduous first molars required .70 fillings per child. Other deciduous teeth were filled much less frequently than the molars, cuspids averaging .17 fillings per child and lateral and central incisors only .04 fillings each per child.

A few services were provided for permanent teeth among children under five, but the number was so small that children under five were omitted from the tables pertaining to permanent teeth.

Among the permanent teeth, the four first molars required more fillings (14,684) than all other teeth combined (13,004). In second place were the second molars with 4,235 fillings, followed by second bicuspids (2,299), central incisors (2,183), lateral incisors (2,118), first bicuspids (1,672), cuspids (474) and third molars (23).

Two fifths (42.8 per cent) of all fillings in permanent first molars were multiple-surface fillings. Multiple-surface fillings comprised 64.4 per cent of fillings in second bicuspids; 54.7 per cent in first bicuspids; 23.1 per cent in second molars; 11.0 per cent in cuspids; 4.6 per cent in central incisors and 3.5 per cent in lateral incisors.

First molars, which usually erupt at age 6 or 7 as the first permanent teeth, required the greatest number of fillings of all permanent teeth at all age levels. At ages 9 and 10 the average child required 3.04 fillings in his four permanent first molars, more than at any other age. The comparable figure was 2.64 at ages 11 and 12, and 2.33 at ages 13 and 14.

For ages 5 through 14 combined, the average number of fillings in permanent first molars was approximately the same

The first five articles in this series appeared in The Journal in August, September, October, November and December 1958.

Table 30 • One-surface fillings in deciduous teeth, by tooth designation and by age of patient

Tooth designation	Age															
	1–2		3–4		5–6		7–8		9–10		11–12		13–14		All ages	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Second molars	67	.21	766	.84	929	.75	609	.45	203	.16	43	.03	9	.01	2,626	.34
Upper	29	.09	403	.44	492	.40	318	.23	116	.09	21	.01	4	—	1,383	.18
Lower	38	.12	363	.40	437	.35	291	.21	87	.07	22	.02	5	—	1,243	.16
First molars	43	.13	294	.32	287	.23	188	.14	37	.03	12	.01	0	.00	861	.11
Upper	19	.06	132	.14	128	.10	84	.06	22	.02	8	.01	0	.00	393	.05
Lower	24	.07	162	.18	159	.13	104	.08	15	.01	4	—	0	.00	468	.06
Cuspids	14	.04	167	.18	362	.29	323	.24	97	.08	16	.01	3	—	982	.13
Upper	4	.01	85	.09	203	.16	194	.14	70	.05	10	.01	2	—	568	.07
Lower	10	.03	82	.09	159	.13	129	.09	27	.02	6	—	1	—	414	.05
Lateral incisors	6	.02	85	.09	73	.06	12	.01	5	—	1	—	2	—	184	.03
Upper	4	.01	67	.07	54	.04	6	—	3	—	1	—	1	—	136	.02
Lower	2	.01	18	.02	19	.02	6	—	2	—	0	.00	1	—	48	.01
Central incisors	12	.04	153	.17	82	.07	11	.01	4	—	2	—	1	—	265	.03
Upper	12	.04	141	.15	74	.06	8	.01	4	—	0	.00	0	.00	239	.03
Lower	0	.00	12	.01	8	.01	3	—	0	.00	2	—	1	—	26	—

Table 31 • One-surface fillings in permanent teeth, by tooth designation and by age of patient

Tooth designation	Age											
	5–6		7–8		9–10		11–12		13–14		5–14	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Third molars	0	.00	0	.00	0	.00	3	—	14	.01	17	—
Upper	0	.00	0	.00	0	.00	1	—	4	—	5	—
Lower	0	.00	0	.00	0	.00	2	—	10	.01	12	—
Second molars	8	.01	19	.01	170	.13	1,175	.83	1,886	1.51	3,258	.50
Upper	5	—	9	.01	50	.04	399	.28	870	.70	1,333	.20
Lower	3	—	10	.01	120	.09	776	.55	1,016	.81	1,925	.29
First molars	638	.52	2,287	1.67	2,225	1.73	1,967	1.39	1,280	1.02	8,397	1.28
Upper	238	.19	1,032	.75	1,058	.82	940	.67	615	.49	3,883	.59
Lower	400	.32	1,255	.92	1,167	.91	1,027	.73	665	.53	4,514	.69
Second bicuspids	4	—	20	.01	115	.09	344	.24	336	.27	819	.13
Upper	3	—	13	.01	53	.04	156	.11	149	.12	374	.06
Lower	1	—	7	—	62	.05	188	.13	187	.15	445	.07
First bicuspids	0	.00	12	.01	111	.09	319	.23	314	.25	756	.12
Upper	0	.00	10	.01	75	.06	216	.15	183	.15	484	.07
Lower	0	.00	2	—	36	.03	103	.07	131	.10	272	.04
Cuspids	4	—	3	—	12	.01	93	.07	310	.25	422	.06
Upper	2	—	3	—	7	.01	65	.05	238	.19	315	.05
Lower	2	—	0	.00	5	—	28	.02	72	.06	107	.02
Lateral incisors	9	.01	84	.06	434	.34	705	.50	812	.65	2,044	.31
Upper	9	.01	61	.04	358	.28	589	.42	670	.54	1,687	.26
Lower	0	.00	23	.02	76	.06	116	.08	142	.11	357	.05
Central incisors	7	.01	97	.07	440	.34	704	.50	835	.67	2,083	.32
Upper	5	—	62	.05	302	.23	534	.38	675	.54	1,578	.24
Lower	2	—	35	.03	138	.11	170	.12	160	.13	505	.08

Table 32 • Multiple-surface fillings in deciduous teeth, by tooth designation and by age of patient

Tooth designation	Age															
	1–2		3–4		5–6		7–8		9–10		11–12		13–14		All ages	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Second molars	27	.08	774	.85	1,751	1.42	1,765	1.29	831	.64	186	.13	20	.02	5,354	.69
Upper	12	.04	347	.38	908	.74	953	.70	454	.35	99	.07	8	.01	2,781	.36
Lower	15	.04	427	.47	843	.68	812	.59	377	.29	87	.06	12	.01	2,573	.33
First molars	28	.09	734	.80	1,784	1.45	1,559	1.14	420	.33	53	.04	3	—	4,581	.59
Upper	6	.02	286	.31	808	.66	778	.57	229	.18	27	.02	3	—	2,137	.27
Lower	22	.07	448	.49	976	.79	781	.57	191	.15	26	.02	0	.00	2,444	.31
Cuspids	2	.01	39	.04	119	.09	96	.07	28	.02	4	—	0	.00	288	.04
Upper	2	.01	13	.01	53	.04	49	.04	22	.02	3	—	0	.00	142	.02
Lower	0	.00	26	.03	66	.05	47	.03	6	—	1	—	0	.00	146	.02
Lateral incisors	2	.01	13	.01	14	.01	9	.01	1	—	2	—	0	.00	41	.01
Upper	2	.01	8	.01	8	.01	7	.01	1	—	1	—	0	.00	27	—
Lower	0	.00	5	.01	6	—	2	—	0	.00	1	—	0	.00	14	—
Central incisors	2	.01	28	.03	7	.01	0	.00	1	—	3	—	0	.00	41	.01
Upper	2	.01	26	.03	6	—	0	.00	1	—	1	—	0	.00	36	—
Lower	0	.00	2	—	1	—	0	.00	0	.00	2	—	0	.00	5	—

Table 33 • Multiple-surface fillings in permanent teeth, by tooth designation and by age of patient

Tooth designation	Age											
	5–6		7–8		9–10		11–12		13–14		5–14	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Third molars	0	.00	2	—	1	—	2	—	1	—	6	—
Upper	0	.00	1	—	0	.00	0	.00	0	.00	1	—
Lower	0	.00	1	—	1	—	2	—	1	—	5	—
Second molars	4	—	10	.01	9	.01	262	.19	692	.55	977	.15
Upper	4	—	8	.01	2	—	132	.09	327	.26	473	.07
Lower	0	.00	2	—	7	.01	130	.09	365	.29	504	.08
First molars	176	.14	1,019	.75	1,686	1.31	1,770	1.25	1,636	1.31	6,287	.96
Upper	112	.09	595	.44	927	.72	1,000	.71	908	.73	3,542	.54
Lower	64	.05	424	.31	759	.59	770	.54	728	.58	2,745	.42
Second bicuspids	6	—	16	.01	53	.04	378	.27	1,027	.82	1,480	.23
Upper	2	—	12	.01	32	.02	218	.15	542	.43	806	.12
Lower	4	—	4	—	21	.02	160	.11	485	.39	674	.10
First bicuspids	3	—	8	.01	26	.02	256	.18	623	.50	916	14
Upper	0	.00	4	—	17	.01	178	.13	412	.33	611	.09
Lower	3	—	4	—	9	.01	78	.06	211	.17	305	.05
Cuspids	0	.00	0	.00	1	—	13	.01	38	.03	52	.01
Upper	0	.00	0	.00	1	—	6	—	30	.02	37	.01
Lower	0	.00	0	.00	0	.00	7	—	8	.01	15	—
Lateral incisors	0	.00	1	—	7	.01	30	.02	36	.03	74	.01
Upper	0	.00	1	—	6	—	28	.02	32	.03	67	.01
Lower	0	.00	0	.00	1	—	2	—	4	—	7	—
Central incisors	2	—	6	—	14	.01	38	.03	40	.03	100	.02
Upper	2	—	6	—	11	.01	30	.02	32	.03	81	.01
Lower	0	.00	0	.00	3	—	8	.01	8	.01	19	—

for upper and lower teeth: 1.13 and 1.11, respectively. At lower ages (5 through 8), more fillings were provided for lower first molars. At ages 9 through 14, more fillings were provided for upper first molars.

The decay differential between upper and lower permanent teeth was greatest for the lateral and central incisor teeth. For ages 5 through 14, the average child required .52 fillings in his four upper incisor teeth, compared to only .13 fillings in his four lower incisor teeth. Virtually all of the fillings in incisor teeth were one-surface fillings.

"Pulp treatments," as shown in Tables 34 and 35, include pulp cap treatments, vital pulpotomies, therapeutic pulpotomies and extirpations of pulp. Among deciduous teeth, the majority of pulp treatments was for second molars (436), followed by first molars (287). For each other deciduous tooth only six or less pulp treatments were recorded.

For permanent teeth, 61.8 per cent of all pulp treatments were for first molars. For molar teeth, the majority of pulp treatments was given for lower teeth. For all teeth other than molars, the majority of pulp treatments was given for upper teeth.

Only 28 permanent crowns were provided for deciduous teeth, and 24 of these were for lower first and second molars. Of the 159 permanent crowns provided for permanent teeth, 60 were for first molars, 56 for central incisors and 20 for lateral incisors.

The number of extractions of deciduous and permanent teeth, by tooth designation, is shown in Tables 36 and 37. No information is available on the reasons for the extractions. Undoubtedly the large majority of both deciduous and permanent teeth was extracted because of advanced dental decay.

Far more second molars (1,774) and first molars (1,361) were extracted than any other deciduous teeth. Extraction of deciduous first and second molars and cuspids reached a peak at ages 9 and 10. The peak for lateral incisors was reached at ages 7 and 8 and for central incisors at ages 5 and 6.

Seventy per cent of all permanent teeth extracted were first molars. Of the permanent first molars extracted, there were

Table 34 • Pulp treatments for deciduous teeth, by tooth designation and by age of patient

Tooth designation	Age																	
	1–2		3–4		5–6		7–8		9–10		11–12		13–14		All ages	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Second molars	2	.01	61	.07	174	.14	124	.09	69	.05	6	—	0	.00	436	.06
Upper	0	.00	11	.01	54	.04	60	.04	29	.02	5	—	0	.00	159	.02
Lower	2	.01	50	.05	120	.10	64	.05	40	.03	1	—	0	.00	277	.04
First molars	2	.01	50	.05	95	.08	106	.08	30	.02	4	—	0	.00	287	.04
Upper	2	.01	16	.02	40	.03	45	.03	14	.01	1	—	0	.00	118	.02
Lower	0	.00	34	.04	55	.04	61	.04	16	.01	3	—	0	.00	169	.02
Cuspids	0	.00	0	.00	2	—	1	—	1	—	1	—	0	.00	5	—
Upper	0	.00	0	.00	2	—	0	.00	1	—	1	—	0	.00	4	—
Lower	0	.00	0	.00	0	.00	1	—	0	.00	0	.00	0	.00	1	—
Lateral incisors	0	.00	2	—	0	.00	1	—	0	.00	0	.00	0	.00	3	—
Upper	0	.00	1	—	0	.00	1	—	0	.00	0	.00	0	.00	2	—
Lower	0	.00	1	—	0	.00	0	.00	0	.00	0	.00	0	.00	1	—
Central incisors	2	.01	4	—	0	.00	0	.00	0	.00	0	.00	0	.00	6	—
Upper	2	.01	4	—	0	.00	0	.00	0	.00	0	.00	0	.00	6	—
Lower	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00

Table 35 • Pulp treatments for permanent teeth, by tooth designation and by age of patient

Tooth designation	Age											
	5–6		7–8		9–10		11–12		13–14		5–14	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Third molars	1	—	0	.00	0	.00	2	—	0	.00	3	—
Upper	1	—	0	.00	0	.00	1	—	0	.00	2	—
Lower	0	.00	0	.00	0	.00	1	—	0	.00	1	—
Second molars	0	.00	0	.00	4	—	16	.01	47	.04	67	.01
Upper	0	.00	0	.00	2	—	4	—	18	.01	24	—
Lower	0	.00	0	.00	2	—	12	.01	29	.02	43	.01
First molars	4	—	70	.05	145	.11	111	.08	103	.08	433	.07
Upper	1	—	23	.02	50	.04	43	.03	52	.04	169	.03
Lower	3	—	47	.03	95	.07	68	.05	51	.04	264	.04
Second bicuspids	0	.00	2	—	1	—	12	.01	31	.02	46	.01
Upper	0	.00	1	—	1	—	8	.01	20	.02	30	—
Lower	0	.00	1	—	0	.00	4	—	11	.01	16	—
First bicuspids	0	.00	0	.00	0	.00	13	.01	18	.01	31	—
Upper	0	.00	0	.00	0	.00	11	.01	14	.01	25	—
Lower	0	.00	0	.00	0	.00	2	—	4	—	6	—
Cuspids	0	.00	0	.00	0	.00	0	.00	3	—	3	—
Upper	0	.00	0	.00	0	.00	0	.00	2	—	2	—
Lower	0	.00	0	.00	0	.00	0	.00	1	—	1	—
Lateral incisors	0	.00	1	—	6	—	24	.02	15	.01	46	.01
Upper	0	.00	1	—	5	—	21	.02	13	.01	40	.01
Lower	0	.00	0	.00	1	—	3	—	2	—	6	—
Central incisors	0	.00	4	—	5	—	40	.03	23	.02	72	.01
Upper	0	.00	2	—	5	—	35	.02	22	.02	64	.01
Lower	0	.00	2	—	0	.00	5	—	1	—	8	—

Table 36 • Simple extractions of deciduous teeth, by tooth designation and by age of patient

Tooth designation	Age															
	1–2		3–4		5–6		7–8		9–10		11–12		13–14		All ages	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Second molars	1	—	29	.03	269	.22	482	.35	559	.43	351	.25	83	.07	1,774	.23
Upper	0	.00	3	—	73	.06	197	.14	280	.22	177	.13	50	.04	780	.10
Lower	1	—	26	.03	196	.16	285	.21	279	.22	174	.12	33	.03	994	.13
First molars	5	.02	42	.05	255	.21	430	.31	449	.35	165	.12	15	.01	1,361	.17
Upper	3	.01	10	.01	90	.07	182	.13	216	.17	94	.07	10	.01	605	.08
Lower	2	.01	32	.04	165	.13	248	.18	233	.18	71	.05	5	—	756	.10
Cuspids	1	—	2	—	13	.01	94	.07	112	.09	72	.05	21	.02	315	.04
Upper	1	—	1	—	5	—	42	.03	55	.04	61	.04	17	.01	182	.02
Lower	0	.00	1	—	8	.01	52	.04	57	.04	11	.01	4	—	133	.02
Lateral incisors	5	.02	9	.01	50	.04	59	.04	13	.01	5	—	1	—	142	.02
Upper	5	.02	7	.01	19	.02	37	.03	4	—	3	—	1	—	76	.01
Lower	0	.00	2	—	31	.03	22	.02	9	.01	2	—	0	.00	66	.01
Central incisors	6	.02	14	.02	97	.08	44	.03	4	—	3	—	1	—	169	.02
Upper	6	.02	10	.01	55	.04	35	.03	4	—	2	—	1	—	113	.01
Lower	0	.00	4	—	42	.03	9	.01	0	.00	1	—	0	.00	56	.01

Table 37 • Simple extractions of permanent teeth, by tooth designation and by age of patient

Tooth designation		Age											
		5–6		7–8		9–10		11–12		13–14		5–14	
		No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Third molars		0	.00	1	—	1	—	0	.00	4	—	6	—
	Upper	0	.00	1	—	1	—	0	.00	0	.00	2	—
	Lower	0	.00	0	.00	0	.00	0	.00	4	—	4	—
Second molars		2	—	2	—	3	—	12	.01	70	.06	89	.01
	Upper	1	—	1	—	2	—	3	—	28	.02	35	.01
	Lower	1	—	1	—	1	—	9	.01	42	.03	54	.01
First molars		1	—	47	.03	153	.12	247	.17	245	.20	693	.11
	Upper	0	.00	5	—	43	.03	84	.06	91	.07	223	.03
	Lower	1	—	42	.03	110	.09	163	.12	154	.12	470	.07
Second bicuspids		0	.00	1	—	5	—	16	.01	43	.03	65	.01
	Upper	0	.00	1	—	3	—	10	.01	33	.03	47	.01
	Lower	0	.00	0	.00	2	—	6	—	10	.01	18	—
First bicuspids		0	.00	1	—	9	.01	21	.01	42	.03	73	.01
	Upper	0	.00	1	—	5	—	14	.01	26	.02	46	.01
	Lower	0	.00	0	.00	4	—	7	—	16	.01	27	—
Cuspids		0	.00	0	.00	0	.00	3	—	7	.01	10	—
	Upper	0	.00	0	.00	0	.00	3	—	6	—	9	—
	Lower	0	.00	0	.00	0	.00	0	.00	1	—	1	—
Lateral incisors		0	.00	0	.00	1	—	8	.01	13	.01	22	—
	Upper	0	.00	0	.00	0	.00	5	—	10	.01	15	—
	Lower	0	.00	0	.00	1	—	3	—	3	—	7	—
Central incisors		2	—	1	—	0	.00	8	.01	15	.01	26	—
	Upper	2	—	1	—	0	.00	5	—	12	.01	20	—
	Lower	0	.00	0	.00	0	.00	3	—	3	—	6	—

more than twice as many lowers as uppers. Among the 6,551 children ages 5 through 14, permanent teeth were extracted as follows: 693 first molars, 89 second molars, 73 first bicuspids, 65 second bicuspids, 26 central incisors, 22 lateral incisors, 10 cuspids and 6 third molars. Of the incisors, 35 were upper teeth and 13 were lower teeth.

Of the 984 permanent teeth extracted, 53 were extracted at ages 7 and 8, and 5 at ages 5 and 6.

The next and final chapter in this series will be a summary of the findings.

Additions to the Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The books listed here have been added recently to the Library collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books, but there is a minimal charge of one dollar for package libraries. Practically all the dental journals published in the world at present are available also to members on loan. Lists of books and package libraries are also available on request.

BOOKS

AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS. Transactions of fifteenth annual meeting, Atlantic City, New Jersey, April 21-23, 1958. Harrisburg, Pa., 1958. 51 p. Mimeo.

AMERICAN DENTAL ASSOCIATION. Second conference of council chairmen and secretaries, December 16-17, 1957. Chicago. 1957. 86 p. Mimeo.

AMERICAN DENTAL ASSOCIATION. Tenth state secretaries' management conference, June 9-11, 1958. Chicago, 1958. 77 p. Mimeo.

AUSTRALIA. COMMONWEALTH DEPARTMENT OF HEALTH. BUREAU OF DENTAL STANDARDS. Tenth & eleventh annual reports, 30th June, 1957. Carlton, Victoria, 1957. 10 p. Mimeo.

BECKETT, J. S. & BERMAN, PHOEBUS. Sterilization and disinfection with special emphasis on autoclave sterilization. North Hollywood, Calif., A. T. I. Publishing Division, 1953. 168 p. $2.50.

BRAUER, J. C. & OTHERS. Dentistry for children. 4th ed. New York, McGraw-Hill, 1958. 492 p. $11.

DELIBÉROS, JEAN. Pathologie des dents et du parodonte. Paris, Baillière, 1959. 670 p.

DENTAL CLINICS OF NORTH AMERICA, November 1958. Symposium on dental materials—their use and recent developments. Philadelphia, Saunders, 1958. 276 p.

DENVER SUMMER MEETING FOR THE ADVANCEMENT OF ORTHODONTIC PRACTICE AND RESEARCH. 20th annual meeting, Writers' Manor, Denver, Colorado, August 4 - August 9, 1957. Denver, 1957. 291 p. Mimeo. $30.

EDUCATIONAL FILM GUIDE, 1954-1958. Edited by Josephine S. Antonini. New York, Wilson, 1958. 448 p.

FORTSCHRITTE DER KIEFER- UND GESICHTS-CHIRURGIE; ein Jahrbuch. Edited by Karl Schuchardt. Vol. 4. Stuttgart, Thieme, 1958. 441 p. DM124.

FRAJNDLICH, MANOEL. Resinas acrílicas de rápida polimerização; (contribuição ao estudo da alteração da côr). Thesis (Docente-livre)—Univ. Rio Grande do Sul. Pôrto Alegre, 1958. 39 p.

FUCHS, A. W. Principles of radiographic exposure and processing. 2d ed. Springfield, Ill., Thomas, 1958. 284 p. $10.50.

INTERNATIONAL CONFERENCE ON ENDODONTICS. Second conference, School of Dentistry, University of Pennsylvania, Philadelphia, June 22-28, 1958. Edited by Louis I. Grossman. 188 p.

KEYS, T. E. Applied medical library practice. Springfield, Ill., Thomas, 1958. 498 p. $10.75.

KING, L. S. The medical world of the eighteenth century. Chicago, Univ. of Chicago Press, 1958. 346 p. $5.75.

KOSSOY, LEON. Hemorragia y enfermedades hemorragiparas; su tratamiento en odontología. Tesis de Doctorado—Univ. Nacional del Litoral. Rosario, Argentina, 1958. 43 p. Mimeo.

MCNAIR SCOTT, T. F. & CRAWFORD, M. N. Canker sores. (Practical dental monographs, September 1958.) Chicago, Year Book Publishers, 1958. 32 p.

MEYER MAST, E. R. Prótesis completas con imanes protéticos. Tesis de Doctorado—Univ. Nacional del Litoral. Rosario, Argentina, 1957. 25 p. Mimeo.

MOYERS, R. E. Handbook of orthodontics; for the student and general practitioner. Chicago, Year Book Publishers, 1958. 498 p. $11.

NATIONAL LIBRARY OF MEDICINE. Guide to Russian medical literature. (Public Health Service publication No. 602.) Washington, 1958. 89 p. $0.40.

OKADA, MITSURU. Kihon teki kanatsu sei kyokubu gishi ho tetsu; essentials of stress breaker type partial denture prosthesis.

Tokyo, Nagasue Shoten, 1958. 603 p. Summaries in English.

PEREIRA, CELSO DE LIMA. Contribuição para o estudo da deflexão dos dentes da mandibula e seus efeitos sobre as cavidades da classe v. Thesis (Docente-livre)—Univ. São Paulo. São Paulo, 1953. 70 p. Mimeo.

SCHWARZ, A. M. Die Röntgenostatik; die kieferorthopädische Diagnose am Fern-Röntgenbild. Vienna, Urban & Schwarzenberg, 1958. 128 p.

STAFNE, E. C. Oral roentgenographic diagnosis. Philadelphia, Saunders, 1958. 303 p. $14.50.

STANFORD, G. H. The conduct of meetings. Toronto, Oxford Univ. Press, 1958. 88 p. $3.25.

STRANG, R. H. W. & THOMPSON, W. M. A text-book of orthodontia. 4th ed. Philadelphia, Lea & Febiger, 1958. 880 p. $20.

THUM, H. J. Narkose-Fibel; für klinische und ambulante operative Eingriffe. Stuttgart, Thieme, 1958. 103 p. DM13.50.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. Aspirin and placebo in oral surgery, by Lucian Szmyd, Clarence M. McCall and Albert L. Porreca. (Report No. 58-81.) Randolph, Texas, 1958. 3 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. Evaluation of the Van Slyke and Hiller modification of the method of Sendroy as applied to the chloride analysis of saliva, by Ira L. Shannon and John R. Prigmore. (Report No. 58-78.) Randolph, Texas, 1958. 7 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. Metabolic patterns of selected members of the genus lactobacillus; potassium uptake studies, by Ira L. Shannon and Norman O. Harris. (Report No. 57-18.) Randolph, Texas, 1957. 6 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. Metabolic studies with lactobacillus under certain space flight conditions, by John A. Kooistra and Norman O. Harris. (Report No. 58-39.) Randolph, Texas, 1957. 4 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. A screening method for evaluating the tissue reaction to dental materials, by Byron G. Butt. (Report No. 57-94.) Randolph, Texas, 1957. 6 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. Sodium and potassium levels of human whole stimulated saliva collected as a low rate of flow from subjects in a select age grouping, by Ira L. Shannon. (Report No. 57-80.) Randolph, Texas, 1957. 6 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. Sodium and potassium levels of human whole stimulated saliva collected at a moderate rate of flow from subjects in a selected age grouping, by Ira L. Shannon. (Report No. 57-99.) Randolph, Texas, 1957. 6 p.

U. S. AIR FORCE. AIR UNIVERSITY. SCHOOL OF AVIATION MEDICINE. The use of phosphorus-32 to evaluate phosphorus requirements of lactobacillus acidophilus, by Norman O. Harris. (Report No. 57-85.) Randolph, Texas, 1957. 5 p.

U. S. CONGRESS. HOUSE. COMMITTEE ON GOVERNMENT OPERATIONS. False and misleading advertising; (dentifrices). 38th report by the Committee on Government Operations, 85th Congress, 2d session. Washington, Govt. Print. Off., 1958. 21 p.

THE YEAR BOOK OF CANCER, 1957-1958. Compiled and edited by Randolph Lee Clark and Russell W. Cumley. Chicago, Year Book Publishers, 1958. 523 p. $8.

Supplement to List of Certified Dental Materials

COUNCIL ON DENTAL RESEARCH

ADDITION • Since publication of the most recent List of Certified Dental Materials, revised to April 1, 1958 (J.A.D.A. 56:752 May 1958), the following materials which conform to American Dental Association Specifications have been added:

CERTIFIED DENTURE BASE RESINS
(A.D.A. SPECIFICATION NO. 12, SECOND REVISION)
TYPE I, HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Characterized Lucitone	Pink; powder-liquid	The L. D. Caulk Co.

CERTIFIED DENTAL CHROMIUM-COBALT CASTING ALLOY
(A.D.A. SPECIFICATION NO. 14)

Material	*Manufacturer or distributor*
Rx Dental Alloy	Vita-Loy Processing & Products, Inc.
Vitallium	Austenal, Inc.

book reviews

STEDMAN'S MEDICAL DICTIONARY

Edited by N. B. Taylor and A. E. Taylor. Nineteenth edition. 1,656 pages with 23 illustrations. $12.50. Baltimore, Williams & Wilkins Co., 1957.

The publication of a medical dictionary is always an event of importance to those in the medical and related fields. In these times of changing concepts and new medications, a dictionary should be of particular significance.

In reviewing the latest edition of this dictionary, one cannot help but be impressed with the tremendous amount of study and effort that was required to compile it. This edition contains, in addition to the contents which would ordinarily be expected, a lengthy section on medical etymology, including Greek and Latin prepositions, the Greek alphabet and other valuable information. Its 70 page appendix gives information on weights and measures, abbreviations, comparative temperature scales, barometric scales, anatomical nomenclature and other miscellaneous data.

It is printed in clear, readable type and is illustrated adequately with a number of plates, too few of which, unfortunately, are in color. More colored illustrations would be desirable.

The editors seem to have established no rational baseline for the selection of words to be included in the book. Among the dental terms, "extrabuccal" is included, but not the more commonly used "extraoral"; "Vincent's angina" is defined, but not "Vincent's infection"; "periodontitis" is included, but not "periodontics" or "periodontology."

Some of the definitions are unusual or at least unfamiliar to this reviewer; "oral teeth" is defined as "anterior teeth, the six front teeth in each jaw." Also, "exodontia" is defined as "(1) tooth extraction (2) forward protrusion of the teeth."

Usually, when a disease or definition is named after a person, some information regarding the person is given; however, this is not always the case in this volume. In the definition of "Histosporidium carcinomatosum" mention is made of Feinberg, but no information regarding Feinberg could be found.

For some reason this reviewer was particularly intrigued with the word, "hodegetics." "Hodegetics" means medical etiquette.

A complete review by the authors of the included dental terms and their definitions and the addition of words which are now omitted would make the book of greater usefulness to the dental profession. Though some terms frequently used by and useful to dentists are omitted altogether, and though other definitions are not completely satisfactory, the book, as a whole, contains much valuable information for the professional person working in the fields of medicine, dentistry, or pharmacy. On the other hand, one cannot help but recognize that this publication—long a bulwark in the dental and medical fields—is losing its position of eminence and authority because it fails to keep abreast of the rapid changes in nomenclature being made by the medical sciences.

Josephine P. Hunt

A TEXTBOOK OF ORAL PATHOLOGY

By William G. Shafer, Maynard K. Hine and Barnet M. Levy. 714 pages with 416 illustrations. Index. $15. Philadelphia, W. B. Saunders Co., 1958.

This textbook of oral pathology is intended primarily for the teaching of undergraduate students, but is also valuable as a reference book for the practitioner. The text is clear, concise, and readable and provides the positive attitude so essential for the undergraduate student. In the selection of subject matter,

the entire field of oral pathology is not covered, but the most common pathologic states encountered in the practice of dentistry are emphasized; however, some of the less common alterations were included for completeness. This book provides a comprehensive coverage of the subject but is not an encyclopedia of oral pathology. A good balance between clinical and histological features of disease has been maintained throughout the text. The division of the book into five sections and 17 chapters may produce some confusion as to the exact nature of some specific disease process; for example, the discussion of cysts under the designation of odontogenic tumors, and tori, exostosis, and fibrosis gingivae under the heading of benign tumors of connective tissue origin. However, this pattern of organization does not present a major pedagogical problem and is somewhat logical as a reference for the practitioner.

The two most frequently encountered oral diseases, dental caries and periodontal disease, receive special emphasis and present a clear, concise and comprehensive discussion of these two pathological states.

The book would be of value to teacher and student for these two chapters alone, but the discussion of neoplasia, bacterial diseases, developmental disturbances, injury and repair, and diseases of specific systems in proper perspective to the specific dental pathology makes it an excellent book for the teaching of oral pathology.

Donald A. Kerr

COMPLETE DENTURE PROSTHESIS

By Daniel H. Gehl, D.D.S., and O.M. Dresen, D.D.S. (Formerly by Rudolph O. Schlosser, D.D.S.). Fourth edition. 542 pages with 310 illustrations. Index. $11. Philadelphia, W. B. Saunders Co., 1958.

This edition, consisting of 24 chapters, has been extensively revised by the elimination of some outmoded technics and the addition of current information on prosthodontics.

The authors have improved the chapters on anatomy and physiology, impression technics and materials, immediate dentures, denture relining, jaw relation records and nutrition, by the inclusion of new and recent ideas regarding these subjects. All phases of complete denture prosthesis are explained minutely and emphasized by repetition to make this text of great value to the dental student.

The material continued from previous editions provides the fundamental background for study, with a complete supplemental list of current literature for the further investigation of any phase of the subject by the practicing dentist. Well illustrated and orderly in design, with readable type, this book should find a place in each dentist's library.

Charles H. Jamieson

PHARMACOLOGY IN MEDICINE

By Victor A. Drill, Ph.D., M.D. and 85 collaborators. Second edition, 1,243 pages. Index. $19.50. New York, McGraw-Hill (Blakiston), 1958.

This is a current, comprehensive book on pharmacology and therapeutics which is useful either as a text or a reference. Unique is the fact that each area of subject matter has been prepared by authoritative writers.

Since empirical therapeutics can only be condemned, any dentist who wishes to understand properly what he is doing when he administers medication to patients would do well to consult a book such as this. In so doing he would learn rational therapeutics, including mechanisms of action, complications, side effects, and other essential information about drugs he may give or drugs his patients are receiving from a physician. Such information may modify his dental procedures.

Of particular value to the dentist are the chapters on local anesthetics, premedication, sedatives, anesthesia, psychopharmacology, anelgesics, specific chemotherapy, general principles of drug action, and prescription writing. All of the information on these subjects is important to the modern dentist and is presented as much for dental as for medical application. Though specific dental implications often are not stated as such, the application of information should be obvious.

This second edition of the book has been brought up to date and expanded to include newer drugs and drug types. Another improvement, in the opinion of this reviewer, has been the return to the traditional page numbering system.

Stanley C. Harris

CLEFT PALATE AND SPEECH

By Muriel E. Morley, M.Sc. Fourth edition. 271 pages, with 86 illustrations. Index. $6.50. Edinburgh, E. & S. Livingstone Ltd., 1958. (The Williams & Wilkins Co., Baltimore, U. S. distributor.)

This handy, well organized volume represents the fourth revision of what has become a valuable, if abbreviated, survey of cleft palate speech problems. The incorporation of considerable material written in the last five years is evidence of increased interest and progress

in the field of cleft palate rehabilitation. The first four chapters are essentially a critical review of the anatomy, morphology and physiology of the palatopharyngeal region, an outline of the development of surgical procedures and brief discussions of associated problems. These chapters are well annotated and up-to-date.

Despite the controversial nature of the author's thesis, "It has been amply proved that the majority of children, following successful operation for cleft palate at one, two or even three years of age, develop normal speech without any aid beyond that which a child naturally receives in its home surroundings," the last four chapters discuss thoroughly those speech problems that do arise and the best means of coping with them. Especially valuable is the last chapter, that on case histories.

The author's style is easy to read and illustrations are adequate. The type and book size makes it very readable; the binding and quality of paper are very satisfactory.

The book is recommended for all who have any interest in the rehabilitation of the cleft palate child.

T. M. Graber

DENTAL PROSTHETICS—
COMPLETE DENTURES

By Raymond J. Nagle, D.M.D., and Victor H. Sears, D.D.S., with the collaboration of Sidney I. Silverman, D.D.S. 532 pages with 360 illustrations. Index. $11.50. St. Louis, C. V. Mosby Co., 1958.

Dental education, especially in prosthetics, has been criticized in the past because of the failure of teachers and textbooks to connect adequately the basic sciences with clinical practice. Nagle and Sears have now made this correlation with remarkable success. They have included many examples of how information about the basic sciences can aid in the successful construction of complete dentures beginning with the diagnosis and continuing to the completion of the prosthesis. Any one of these practical hints is worth many times the actual cost of the textbook. The authors' philosophy can be summed up best by the statement on page 388, "the less we assume and the more we reason in harmony with the basic factors, the more scientific and valid will be our conclusions."

In Part 1, all aspects of the basic sciences are discussed; in Part 2, their relation to clinical procedures is covered. The authors do not subscribe to a rigid formula for all patients, but rather outline the essential features which should be encompassed in any technic. The importance of the minutest detail, which means so much to success, is thoroughly documented.

The bibliographies included with each chapter are up to date and very extensive. They give the reader an opportunity to seek other opinions on the subjects being discussed. The type is legible and the illustrations are excellent. The nomenclature of all terms throughout the book is based on the new "Glossary of Prosthodontic Terms," which is reprinted in full.

This textbook is highly recommended, not only to the undergraduate student, but also to the general practitioner as well as the prosthetic specialist.

L. E. Kurth

INFECTIOUS DISEASES OF CHILDREN

By Saul Krugman, M.D., and Robert Ward, M.D. 340 pages with 44 illustrations. Index. $10. St. Louis, C. V. Mosby Co., 1958.

Wisely, the authors point out that the enthusiasm over new medicines and treatments that have been developed in recent years should not be permitted to obscure the fact that most of the "old time" diseases are still with us, and that virus strains appear to be occupying a more threatening position. The back-to-fundamentals approach to the diagnosis and treatment of childhood diseases that is emphasized in the volume is desirable and helpful.

In addition to virtually encyclopedic coverage of all diseases that may occur in children, the authors have special chapters on topics such as Coxsackie virus infections, viral hepatitis, salmonella and shigella infections, and herpes simplex disorders. Others worthy of note include a discussion of the staphylococcus problem, of much current concern, and toxoplasmosis.

Control of communicable diseases is dealt with in a guest-author chapter by the physician in charge of the Bureau of Preventable Diseases in New York City. Special emphasis is placed on services that can be provided by general hospitals.

The volume is well illustrated, with the extra feature of seven excellent color plates picturing diphtheria, herpes, Koplik's spots, reaction to smallpox vaccine, eruptions complicating vaccinia, eczema vaccinatum, and scarlet fever. Extensive references are provided at the end of each chapter.

William W. Bolton

DIE INFEKTIONSKRANKHEITEN DES MENSCHEN UND IHRE ERREGER (INFECTIOUS DISEASES IN MAN AND THE CAUSATIVE MICROORGANISMS)

Edited by A. Grumbach and W. Kikuth. Two volumes. 1,702 pages. Index. DM. 198. Stuttgart, Georg Thieme, 1958.

The editors of this excellent work on infectious diseases and bacteriology have assembled a large number of international collaborators, each of them a renowned specialist in his field. The material is presented in a clear, concise and useful manner and consists of the principles of contagion and immunology, an elaborate system of classification of microorganisms and a description of modern treatment methods.

Although this work was written for physicians, several of its chapters are of great interest to the practicing dentist, the dental educator and the dental student who have an adequate knowledge of the German language. This textbook seems to be a model of brevity and accuracy, with an unerring flair for the essential, a judicious presentation of the controversial and a delightful (uncommon in German writing) simplicity of diction.

All these virtues, added to the excellent typography, attractive binding and format and excellent paper quality, justify unreserved praise.

The inclusion of illustrations, however, would undoubtedly facilitate a better understanding of the subject matter for persons with a limited knowledge of German. Some of the chapters are translations (those of the Scandinavian and American authors), and the translators are to be commended for their success in conveying the exact meaning of the original contribution.

Paul H. Glucksman

THE PHOTOGRAPHY OF GROSS SPECIMENS

Kodak Publication No. N-5. 24 pages with 15 illustrations. 75 cents. Rochester, N. Y., Eastman Kodak Co., 1958.

This booklet is representative of a number of Eastman publications that have been instrumental in eliminating many problems in clinical photography. The text is well organized and clearly written.

Although no new information is presented, the text represents an accumulation of known photographic factors arranged in a comprehensive and well written form. Because of the source of publication, the tables and photographs are of excellent quality and clearly illustrate the specific points discussed in the text. The double column format, large type and glossy paper contribute further to the ease with which the book may be read.

The text is focused on the photography of tissue specimens much larger than those encountered in dentistry; however, the photographic principles are directly applicable to intraoral photography. It further accents the need for a similar publication concerned with photography of the oral cavity.

Seymour H. Yale

AN EXAMINATION OF THE CONCEPT OF MEDICAL INDIGENCE

By Odin W. Anderson, Ph.D., and Harold Alksne, M.A. 14 pages. New York, Health Information Foundation, 1957.

This pamphlet is devoted to the problem of providing health care through public assistance to those individuals who are able to provide for food, shelter and clothing through their own resources but are unable to meet the costs of their health care. The term "medically indigent" has been the source of much controversy because of its lack of definition. The first section of this booklet discusses the concept of medical indigence from the standpoint of its abstract definition, its social definition and, finally, its administrative definition. The point is well made that the ability to meet the costs of health care is related to many factors, such as limitation of funds, severity and extent of the health problem.

The second section of the pamphlet discusses the chief characteristics of the Maryland Medical Care Program for the Medically Indigent, using the data compiled from the experience of the Anne Arundel County administrative unit. It is a good description of the basic framework of the program, including services provided and eligibility requirements, and of the administrative controls. The discussion of the latter aspect provides the basic methods for relating services purchased to the need for care and the limitations of funds.

The third section describes the people receiving care according to classification of families by types, age composition and income. It also includes cost of services, duration of certification and utilization of services, insights derived from 83 families interviewed on the basis of history of dependency, their source of knowledge of the program and their perceptions of the program. The pamphlet concludes with a section on generalizations and implications such as characteristics of medical indigence, observations on the program and possible extent of medical indigence.

With the present interest throughout the country in public assistance programs for health care and the expanded program of federal matching grants for health care, dentists and dental societies are becoming more and more involved in the planning of programs. The "medically indigent" segment of the population is coming more into focus and must be considered in the development and operation of public assistance programs. This pamphlet can provide much of the information which dental societies and agencies concerned with the problems of improving the availability of dental care will require if they are to be prepared adequately to advise state public welfare departments on the development and operation of dental care programs. This pamphlet should be in the library of each state dental society in sufficient quantity to supply its agencies dealing with dental care and the costs of dental care.

Rudolph H. Friedrich

MICROTECHNIQUES OF CLINICAL CHEMISTRY FOR THE ROUTINE LABORATORY

By Samuel Natelson, Ph.D. 484 pages with numerous illustrations, charts and graphs. Index. $11. Springfield, Ill., Charles C Thomas, 1957.

In this book, Dr. Natelson describes an ingenious microquantitative chemical method for the determination of about 80 different constituents of the blood and other biological fluids. He emphasizes the common clinical laboratory procedures such as tests for blood sugar, hemoglobin, protein, and so forth. In addition, he describes many methods such as those for arginase, arsenic, carbonic anhydrase, citrate, copper, cyanide, glucuronic acid, mercury, morphine and riboflavin.

The methods, because of the extremely small specimen volume, are well suited to clinical work with children and in animal research, as well as to work with severely ill adult patients from whom only small specimens can be obtained. They do, however, require a higher degree of technical excellence and care in performance in order to obtain the accuracy and precision which the commonly used clinical laboratory methods (with specimen volumes of 0.2 to 2 ml.) yield.

The future of clinical chemistry methodology certainly lies in the direction of micro procedures. This book should be of great interest to clinical and research chemists and to participants in clinical care or animal research projects requiring microchemical methodology.

John Fuller

BOOKS RECEIVED BUT NOT REVIEWED

PUBLIC HEALTH AND HOSPITALS IN THE ST. LOUIS AREA: A MID-CENTURY APPRAISAL • By American Public Health Association, Inc. 414 pages. American Public Health Association, Inc., 1790 Broadway, New York, 1957.

MODERN PRESCRIPTION DRUGS: A REPORT OF THEIR IMPACT ON THE FAMILY BUDGET • By Citizens' Committee for Children of New York City, Inc. 53 pages. $1. Citizen's Committee for Children of New York City, Inc., 112 E. 19th St., New York, 1958.

THE EXTENT OF CANCER ILLNESS IN THE UNITED STATES • By Biometry Branch of the National Cancer Institute. 23 pages with illustrations. 25c. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 1958.

FORENSIC MEDICINE • By Keith Simpson, M.D. 3d ed. 352 pages with illustrations. $7. Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore, Md., 1958.

THE HISTORY OF THE MEDICAL DEPARTMENT OF THE UNITED STATES NAVY, 1945-1955 • 224 pages with illustrations. U. S. Government Printing Office, Washington 25, D. C., 1958.

ERGEBNISSE DER MEDIZINISCHEN GRUNDLAGENFORSCHUNG • By K. Fr. Bauer, 855 pages with illustrations. DM. 129. Georg Thieme Verlag. Herdweg 63, 14a Stuttgart, Germany, 1956.

THE ESOPHAGUS: MEDICAL AND SURGICAL MANAGEMENT • By Edward B. Benedict, M.D., and George L. Nardi, M.D. 390 pages with illustrations. $15. Little, Brown & Company, 34 Beacon St., Boston, 1958.

current literature

TOOTH IN THE MAXILLARY SINUS

Arthur D. Eastman. J. Oral Surg. 16:254 May 1958.

The patient was a well developed white seaman 21 years old. His only complaint was that a few drops of any liquid he drank ran out of his nose.

An abscessed upper right second molar had been extracted nine months previously. After a slow healing course the patient was asymptomatic until just prior to admission.

Examination showed a small oroantral fistula in the region of the upper right second molar. Roentgenographic studies revealed a fully developed molar tooth high in the sinus. Its lower border was 1 cm. above the antral floor.

A Caldwell-Luc type of incision and window was done under block anesthesia. Hanging from the most superior portion of this healthy appearing antrum was a pillar of smooth bone, which completely encased the tooth. This was removed, a hole punched through the mesial wall to the inferior meatus of the nose, and petroleum jelly gauze threaded through and out the right nostril. The sinus was lightly filled in folds and the wound closed.

Forty-eight hours postoperatively, about 18 inches of gauze was drawn out through the nostril. A like amount was withdrawn each day until on the sixth day none remained and the sutures were removed.

The oroantral fistula was repaired on the tenth day. Recovery was uneventful from both stages of the operation.

Upon removal of the tooth it was seen that the bone encasing it was about as thick and uniform as parchment paper. The apical ends of two of the pulps protruded beyond the apex about 1.5 mm. and were obviously vital. A complete and healthy pink tooth follicle covered the crown. This was in effect a normal, healthy unerupted tooth in its own alveolar process, not remotely connected to or driven from the alveolar process of the maxilla.

PROGNATHISM CORRECTED BY OPEN VERTICAL SUBCONDYLOTOMY

Marsh Robinson. J. Oral Surg. 16:215 May 1958.

A new surgical approach to vertical division of the ascending rami for the correction of prognathism is presented.

Through submandibular incisions the masseter muscles are elevated and the rami divided with a saw. The osteotomy is from the deepest portion of the notch to a point 1 to 3 cm. above the angle on the posterior border. The body of the mandible is then placed in a predetermined postoperative position with the condylar fragments lateral. The jaws are immobilized for seven weeks for healing of the overlapping bones.

Since 1954 the author and his oral surgery residents have used this new technic in 43 patients. Three abbreviated case histories are reported.

MIXED TUMOR IN AN EIGHT YEAR OLD CHILD

George Stinson and Robert I. Scileppi. J. Oral Surg. 16:167 March 1958.

An eight year old boy with a swelling of the palate was examined. The patient was in good physical condition and the swelling, of six months duration, was nontender to palpation, reddish blue in color, and appeared to be cystic in nature.

Roentgenographic examination revealed a

radiolucent area, approximately the size of a walnut, in the maxillary left deciduous cuspid and molar region. Clinical impression at this time was dentigerous cyst.

An attempt was made to aspirate cystic fluid, but this was not successful, and as an alternative, a biopsy specimen was taken. The biopsy report was that of a mixed tumor of a minor salivary gland.

A wide excision of the mass was made, including extraction of the first and second deciduous molars which were within the confines of this region. The mass was well encapsulated and was enucleated with ease. Further pathological study confirmed the original biopsy diagnosis of mixed tumor of a minor salivary gland. The postoperative course was uneventful and healing was complete within a two month period.

Although usually occurring in patients past the fourth decade, this type of lesion may occur in younger patients with mixed dentition, leading to faulty diagnosis.

In general, mixed salivary tumors can be classified as benign, malignant, or locally malignant or recurrent. Since they are extremely resistant to radiation therapy, the treatment of choice is wide excision and postoperative observation.

CORRECTION OF PROGNATHISM BY SUBCONDYLAR OSTEOTOMY

E. C. Hinds. J. Oral Surg. 16:209 May 1958.

The two most popular procedures for treatment of mandibular prognathism are ramus osteotomy and bilateral body ostectomy. Conservation of the teeth and improvement of the gonial angle can be accomplished by a procedure in the ascending ramus. Variations of this procedure are bilateral condylectomy, vertical osteotomy, subsigmoid notch ostectomy and subcondylar osteotomy. The last named procedure performed under direct vision has been found to be simple with little possibility of open bite, or nonunion resulting. The danger of a nerve or blood vessel injury is minimized.

Of 20 patients that have been seen in the past three years, only one was not suitable for a subcondylar osteotomy because of disparity between the maxillary and mandibular arches requiring the use of bilateral body ostectomy procedure.

A 2.5 cm. incision is made beneath the angle of the mandible. The muscle is stripped from the lateral aspect of the angle and ramus, exposing the coronoid process, sigmoid notch and condyle. Using a head light the entire ramus can be visualized. Drill holes are made on a line extending obliquely from the sigmoid notch to a point just superior to the angle of the mandible with number 8 round burs. The osteotomy cut is finished with an osteotome. The masseter and internal pterygoid muscles are separated from the posterior fragment which allows placement lateral to the anterior fragment. Edentulous patients are suitable for this procedure when modified Gunning splints are used for fixation. Patients are dismissed 3 to 4 days postoperatively. No antibiotics are given unless intraoral surgery is performed.

EVALUATION OF HYDROCORTISONE IN THE PREVENTION OF POSTOPERATIVE COMPLICATIONS AFTER ORAL SURGERY: A PRELIMINARY REPORT

Russell Ross and Charles P. White. J. Oral Surg. 16:221 May 1958.

The removal of impacted mandibular third molars, requiring the preparation and retraction of a mucoperiosteal flap, and the removal of bone, is a traumatic procedure which is frequently followed by edema of varying quantity, discomfort to the patient, trismus, and at times, delayed healing. This is a preliminary report, of a double blind study, evaluating the efficacy of hydrocortisone in preventing these sequelae.

The steroids have a broad range of activity, including the regulation of water and electrolyte balance; metabolism of carbohydrate, fat, and protein; anti-inflammatory and anti-allergic action, and many other effects on tissues. Since it was discovered that cortisone could relieve the signs and symptoms of rheumatoid arthritis, steroids have been used in the management of many conditions, bearing out in some measure the general adaptation syndrome proposed by Selye.

Sixty-one patients having impacted mandibular third molars indicated for removal which would require the preparation of a tissue flap and the removal of bone were included in this study. Reports of as many patients as possible undergoing the procedure bilaterally have been utilized.

Such factors as the amount of trauma, the length of the procedure, the difficulty of the procedure, and the patient's reliability in taking his prescribed medication were included in the evaluation. The patients were premedicated with either hydrocortisone or a suitable placebo. Four hundred milligrams of hydrocortisone was given over a four day period. All patients had eosinophil counts on periph-

eral blood samples taken: one the day before the medication was begun, and one the day of the operation, to determine whether adequate blood levels of the drug, demonstrating a therapeutic effect, were present.

The patients were seen on the next three postoperative days, at which time the amount of edema, trismus, pain, and discomfort were judged. A statistically significant number of patients showed a reduction in edema when hydrocortisone was used. Further study of larger numbers of patients must be done before the factor of postoperative pain can be evaluated.

TREATMENT OF HUMAN BITES OF THE LIP

Daniel M. Laskin and William B. Donohue. J. Oral Surg. 16:236 May 1958.

Fourteen instances of human bites of the lips are reported. The injuries encountered were classified into three types: puncture wounds or linear tears; the separation of a pedunculated flap of tissue, and the complete avulsion of a portion of the lip.

Whereas human bites in most regions of the body are treated by extensive debridement and cauterization, such therapy applied to the face would be extremely disfiguring. To overcome this difficulty, lip wounds in this series were treated by immediate closure in conjunction with antibiotic therapy. In most instances, tetanus antitoxin also was administered.

The surgical technics required for the correction of each type of wound are described and illustrated. The procedures varied according to the site of the lesion, the amount of tissue lost and the cleanliness of the wound. Primary healing and excellent cosmetic results were obtained in all instances. On the basis of these observations it is suggested that human bites of other regions of the face probably also can be treated in the same manner.

TREATMENT OF TIC DOULOUREUX WITH STILBAMIDINE ISETHIONATE

Albert A. Antoni and J. H. Johnson. J. Oral Surg. 16:226 May 1958.

Stilbamidine isethionate was administered to seven patients to relieve the paroxysmal pain of tic douloureux. 0.15 Gm. of the salt was dissolved in 200 cc.'s of a 5 per cent glucose solution in sterile distilled water. This was administered on consecutive days by slow intravenous drip, the period of administration covering one hour. The number of daily injections was varied for each patient and ranged from a maximum of 14 injections for one patient to a minimum of five for another. This was done in an effort to understand and evaluate the potentialities and action of the drug.

All the patients were relieved of pain, but only after a posttreatment waiting period of four to five months, during which the attacks continued, with symptoms exacerbated during the third and fourth posttreatment weeks. Those receiving the greater number of daily injections suffered from side reactions, which those who received the minimal number of injections did not experience. These consisted of symptoms of formication and severe urticaria over the entire distribution of the trigeminal nerve, which did not subside for 12 months. All patients were free from pain five months after treatment. The paroxysms of tic douloureux have recurred to date in only one patient. This patient had received only five injections and is now pain-free after the administration of a single additional booster injection.

The drug becomes toxic on exposure to light and must be administered with caution and meticulous care. More time is needed for observation of the series treated and for estimating the optimum dosage. The observations suggest that remission of pain may be accomplished with much smaller dosage than originally advocated and that the patient may be kept pain-free with a single booster dose when indicated. The method shows great promise, particularly for the poor-risk surgical patient and should be investigated further. There are 11 references.

CONTROLLED RECTAL ANESTHESIA FOR THE FEARFUL OR HANDICAPPED PATIENT

Boyd F. Sprague. J. Oral Surg. 16:202 May 1958.

Certain benefits can be gained by the use of general anesthesia's first and second stages as operative levels suitable for dental purposes among the extremely fearful and handicapped patients, using nonstimulating and traumaless rectal anesthesia.

Dental operations carried out under general, light, controlled anesthesia provide and increase the mental and physical safety factors and also facilitate the work at hand.

After viewing the equipment, the twin tube oral evacuator appears more effective and adjustable than single tube aspirators used in general operative dentistry and surgery.

The contour chair's greater body-supporting ability minimizes patients' muscular fatigue

and indirectly decreases the patients' anesthetic and drug requirements with its tranquilizing effect.

The technic's unusual safety control and the superior action of 20 per cent thiopental sodium over the conventional 10 per cent mixture with the elimination of certain preoperative procedures are explained and some of the reasons for the abolition of some old customs are discussed.

Controlled rectal anesthesia is clearly demonstrated as a means to an end, and physical restraint never again need be used in the dental office, regardless of how uncooperative a patient may appear.

RIDGE EXTENSION: REVIEW OF INDICATIONS AND TECHNICS

Gustav O. Kruger. J. Oral Surg. 16:191 May 1958.

Surgically created sulci adjacent to the resorbed alveolar ridge require an epithelial flap on at least one side of the wound in order to prevent loss of the sulcus. There are several methods for obtaining this flap. Some of the technics employ an incision over the crest of the ridge and others place the incision on the mucosal surface of the lip and cheek.

There are other variations in methods for ridge extension. Some technics incise the periosteum in order to smooth the underlying bone, and others make use of the intact periosteum for protection of the bone and as a base to which the epithelial flap is sutured. There are several methods for mechanical stabilization of the artificially created sulcus depth.

If surgery on the labial or buccal aspect of the jaw is impractical, usually because of extreme resorption, technics for repositioning the mylohyoid muscle afford considerable depth for the placement of long lingual flanges on the denture.

BACTERIAL CONTROL OF ENDODONTIC TREATMENT: BACTERIOLOGICAL EXAMINATION OF ROOT CANALS, TREATED WITH POLYANTIBIOTICS

J. van Amerongen, C. O. Eggink and A. C. Lamers. Tschr.tandheelk. 65:65 Feb. 1958.

The use of polyantibiotics in endodontic treatment is based essentially on the investigations by Grossman, Seltzer and Bender. These authors indicate that a comparatively small number of antibiotic treatments are required to obtain sterility in the root canal. They assume that a treated root canal can be considered sterile if it yields negative cultures. This assumption, however, is subject to criticism.

If a culture is taken from a root canal treated with a multiantibiotic mixture, residues adhering to the absorbent point may inhibit temporarily the bacterial growth. The result could be a "false" negative culture.

To prevent obtaining misleading cultures, every trace of the antibiotic mixture must be removed prior to culture taking. The canal should be wiped with absorbent points several times before the culture is taken.

Buchbinder and Bartels made growth inhibition tests of root canals which were cleaned thoroughly after treatment with antibiotics. All cultures showed inhibition of bacterial growth on agar plates, inoculated with *Escherichia* and *Staphylococcus pyogenes* var. *aureus*. These authors considered the cultures taken from root canals treated with antibiotics unreliable unless inactivators were used against the components of the antibiotic and sterilizing agents remaining in the canal.

At the Dental Institute of the University of Utrecht, the Netherlands, bacterial growth inhibition tests were carried out immediately after mechanical preparation and irrigation with a mixture of sodium chloride and sodium hypochlorite and with hydrogen peroxide.

In the first tests, 25 root canals, irrigated with these medicaments, were dried with four absorbent points. Each of the points was deposited in a culture containing 5 ml. brain heart infusion broth. The tubes were closed with sterile cotton. After two hours, all tubes were uniformly inoculated with overnight cultures of penicillin-sensitive staphylococci. The culture tubes were incubated for 72 hours at a temperature of 37° C.

In the second test, 50 root canals, after mechanical preparation, were filled with camphorated chlorophenyl. After application of sterile cotton pellets to the canal entrance, each cavity was sealed with zinc oxide-eugenol cement and gutta-percha for seven days. The absorbent points, used for wiping and drying, were processed in the same manner. Inoculation and incubation were carried out as described.

In the third test, 129 root canals were filled with a multiantibiotic paste which contained the following ingredients: dihydrostreptomycin (200 mg.), chloramphenicol (200 mg.), potassium penicillin G (200,000 I.U.), sodium caprylate (200 mg.) and silicone fluid (q.s. 1.6 Gm.). All root canals were sealed with zinc oxide-eugenol cement and gutta-percha.

After one week, the temporary filling materials and cotton pellets were removed. The

Yes, Doctor, this is a denture case...
For details, please turn the page.

This is the same girl as on the preceding page, BUT . . .

. . . she is wearing an old fashioned, conventional denture that fairly shouts "false teeth" to all the world.

She *looks* like a different person and *is* a different person. (Or *was*, until she began wearing a modern, cosmetic denture.)

How could she have self-confidence with a smile like this? Would she even smile at all? How could she enjoy youth when her face cries out premature age?

Wouldn't she feel that most of the fun had gone out of life?

Fortunately, the story does not end this way. For a brief resumé of how the dentist created esthetic dentures which restored this girl's youth and confidence, see the opposite page.

The miracle achieved by denture esthetics

The miracle here is in the physical and psychological transformation of the patient. The denture which helped achieve the miracle is typical of the results being accomplished with Trubyte Bioform Teeth and the Trubyte Bioform *System* of Tooth Selection and Arrangement.

It can be readily seen how the esthetic denture has restored the patient's youth and vitality by achieving the four harmonies of form, size, color and arrangement. The tapering teeth harmonize with her tapering face *form;* the *size* of the teeth are in correct proportion to her face size and length-to-width relationship; the *color* in the individual teeth and the interplay and blending of color in the total arrangement of the teeth harmonize with her youthful complexion. Lastly, the tooth *arrangement* harmonizes with the character and individuality of the face, recreating the asymmetry as expressed by the greater strength and dominance in the right side.

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Enables you to verify your mould selection immediately when your patient is in the chair; the unique 7-drawer design facilitates selection of teeth which harmonize with the patient's face form; contains all the available upper and lower anterior moulds of Trubyte Bioform Teeth.

TRUBYTE BIOFORM SHADE SELECTOR ASSORTMENT

Enables you to verify your shade selection in the mouth of the patient; provides an easy and accurate method of shade selection for full and partial dentures.

TRUBYTE TOOTH INDICATOR

An accurate guide to help you select the Trubyte Bioform Teeth which harmonize with the patient's face form and size.

TRUFLEX SELECTOR

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consists of a number of specially selected photographic studies of the "before and after" complete denture cases illustrated in the slide library catalog. 8 x 10 portrait color prints and 5 x 7 mouth close-up studies are available in portrait-type mounts.

Write for your copy of the Trubyte Slide Library Catalog. Department B.

THE DENTISTS' SUPPLY COMPANY OF NEW YORK YORK, PENNSYLVANIA

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root canals were thoroughly cleaned so that no residues of the multiantibiotic paste remained. Three successive absorbent points were used for each canal. Generally, on the last point no trace of the paste could be observed macroscopically. The three points were deposited in separate culture tubes, labeled I, II and III.

In addition, 52 of these 129 root canals were cleaned again with absorbent points which were placed in culture tubes, labeled IV A and V A.

For the purpose of comparison, in the other 77 root canals attempts were made to remove traces of the paste from the root apexes with a thin Hedström file and an irrigation with a 2 ml. sterile saline solution. After being dried, the canals were wiped with two absorbent points which were placed in culture tubes labeled IV B and V B. For the purpose of control, all 129 root canals were wiped again with absorbent points which were deposited in culture tubes labeled VI.

After a microscopic study of all culture tubes which had been inoculated and incubated as described, the following conclusions were reached:

1. If the cleaning was done by wiping the root canals with absorbent points, even the fifth point still showed inhibition of bacterial growth in 38 per cent of instances after an incubation for 72 hours.

2. If the cleaning was done with a Hedström file and an irrigation with a 2 ml. sterile saline solution, inhibition of the bacterial growth did not occur.

Although this test method does not provide absolute evidence for occurrence or nonoccurrence of the inhibition of bacterial growth, it seems obvious that reliable cultures can be taken from root canals which are treated with multiantibiotic mixtures after the canals are cleaned by thorough irrigation.

LOSS OF VERTICAL DIMENSION IN TOBACCO CHEWERS AND ITS RELATION TO COSTEN'S SYNDROME

Eugene J. Murphy. J. Oral Surg. 16:243 May 1958.

The various diseases and disturbances of the temporomandibular joint present one of the most obscure and controversial problems in medical science. The etiology of many of these phenomena is unknown, and there are many unsolved anatomic and functional questions to be answered.

Every dentist encounters instances of mandibular joint disturbances commonly known as Costen's syndrome. Unquestionably no single factor is responsible for this syndrome. However, investigators seem fairly well agreed that loss of vertical dimension is usually the cause of much of the dysfunction.

While making a study of the problem at the Veterans Administration Hospital, Louisville, Ky., the author became aware of the fact that numerous lifelong tobacco chewers suffered a tremendous loss of vertical dimension without any signs or symptoms of temporomandibular joint disturbances.

During a five year period a careful study was made of 100 such patients. Only those having a complete or almost complete natural dentition were selected. This presented no problem inasmuch as these particular tobacco chewers were rarely edentulous and had practically no caries, gingival diseases, or periodontal involvements. Most of them chewed home grown tobacco which, of course, had no addition of a sweetening agent or any type of refinement. In every instance the abrasive action of the tobacco had ground the teeth down so that flat or concave surfaces were formed, generally the former.

In this series only four patients had any complaints of temporomandibular joint trouble and these were minor. It seems reasonable to assume that loss of vertical dimension is rarely a factor in the syndrome when cusp interference has been removed.

SURGICAL CILIATED CYSTS OF THE MAXILLA

G. Thaddeus Gregory and William G. Shafer. J. Oral Surg. 16:251 May 1958.

A series of cases is reported illustrating a type of cyst developing in the maxilla after a surgical entrance into the maxillary sinus, as in the Caldwell-Luc operation. The cyst lining is a pseudostratified ciliated columnar epithelium and appears to originate from sinus epithelium entrapped along the line of closure at the time of the sinus operation. It may take many years for these cysts to develop.

Patients usually complain of a poorly localized pain or discomfort and, on roentgenographic examination, show a well-defined radiolucency adjacent to the maxillary sinus. Injection of radiopaque material into the maxillary sinus shows a filling defect of the cyst.

deaths

Abbott, De Verne, Columbus, Ohio; Ohio Medical University College of Dentistry, 1900; died September 6; age 80.

Abraham, Alfred C., Brownsville, Pa.; University of Pittsburgh School of Dentistry, 1903; died May 25; age 75.

Addleman, Helen F., Chicago; Pennsylvania College of Dental Surgery, 1899; died August 16; age 76.

Andrews, Ross W., Elizabethtown, Pa.; Western Reserve University School of Dentistry, 1899; died June 21; age 84.

Barr, Charles, Monroe, N. Y.; New York College of Dentistry, 1925; died August 19; age 58.

Barr, Walter G., Dodge City, Kan.; Kansas City Dental College, 1906; died September 3.

Berkelhammer, Isaac E., New York; College of Dental and Oral Surgery, New York, 1919; died July 28.

Blachly, Louis D., Wichita, Kan.; Western Dental College, 1904; died August 16; age 73.

Blocher, Edgar T., Canton, Ill.; University of Pennsylvania School of Dentistry, 1903; died September 6; age 76.

Boman, Herbert L., Chicago; Northwestern University Dental School, 1917; died September 11; age 67.

Brown, Claude, Girard, Ill.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1926; died August 12; age 54.

Brown, Frederic W., Great Barrington, Mass.; Tufts College Dental School, 1918; died August 14; age 61.

Brown, George J., Philadelphia; Pennsylvania College of Dental Surgery, 1896; died May 2; age 90.

Burke, John J., Kirkwood, Mo.; St. Louis University School of Dentistry, 1914; died August 16; age 69.

Butler, Patrick M., Chicago; Northwestern University Dental School, 1919; died August 26; age 65.

Caldwell, Wilbur B., Hamilton, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1898; died September 6; age 83.

Clapp, Victor A., Livonia, N. Y.; University of Buffalo School of Dentistry, 1896; died August 16; age 88.

Clark, Henry D., Chicago; Louisville College of Dentistry, 1914; died August 14; age 72.

Cofield, Kenneth R., New Orleans; Indiana Dental College, 1923; died August 24; age 58.

Coombe, Benjamin C., Mercer, Pa.; University of Pittsburgh School of Dentistry, 1914; died May 31; age 68.

Corrigan, Aubert J., Olean, N. Y.; University of Buffalo School of Dentistry, 1914; died September 12; age 73.

Cottom, Joseph R., Dawson, Pa.; Pittsburgh Dental College Western University of Pennsylvania, 1906; died August 9.

Craycroft, William W., Southgate, Calif.; University of California College of Dentistry, San Francisco, 1904; died September 9; age 87.

DeKrauze, Louis H., Argo, Ill.; Northwestern University Dental School, 1909; died September 27; age 88.

de Shazo, George S., Washington, D. C.; Georgetown University School of Dentistry, 1934; died August 27; age 55.

Dewell, Charles B., Long Pine, Neb.; Creighton University College of Dentistry, 1908; died June 4; age 70.

Doyle, Daniel E., North Attleboro, Mass.; Baltimore College of Dental Surgery, University of Maryland, 1921; died August 6.

Eisaman, Irwin M., Braddock, Pa.; Philadelphia Dental College, 1898; died August 11; age 89.

Fleming, Arthur H., Louisburg, N. C.; University of Pennsylvania School of Dentistry, 1902; died September 6; age 76.

Friedman, Henry E., Cleveland; Western Reserve University School of Dentistry, 1915; died September 7; age 64.

Garcia, Eugene M., St. Louis; St. Louis University School of Dentistry, 1904; died June 29; age 78.

Garrison, Roscoe D., Fort Wayne, Ind.; Indiana Dental College, 1916; died July 6; age 68.

Gerrard, Charles, Portland, Ore.; died August 31; age 62.

Gillespie, Guy M., Abilene, Texas; Vanderbilt University School of Dentistry, 1921; died August 20; age 60.

Gottlieb, David H., Trinidad, Colo.; Northwestern University Dental School, 1903; died September; age 78.

Graft, Walton J., Newark, N. J.; Baltimore College of Dental Surgery, University of Maryland, 1910; died September 5; age 71.

Greco, Joseph R., Brooklyn; Georgetown University School of Dentistry, 1943; died September 7; age 40.

Greer, E. Frank, Vandalia, Ill.; died August 24; age 67.

Griggs, Eugene S., New Brunswick, N. J.; University of Pennsylvania School of Dentistry, 1907; died August 29; age 74.

Hagerty, Daniel J., Nashua, N. H.; Tufts College Dental School, 1918; died September 10; age 67.

Haimowitz, Melvin, Jacksonville, Fla.; Emory University School of Dentistry, 1947; died June 10; age 34.

Haseltine, Lawrence F., Burbank, Calif.; University of Southern California School of Dentistry, 1913; died August 20; age 81.

Helwig, Charles L., Ringoes, N. J.; Tufts College Dental School, 1923; died September 15; age 64.

Hilty, Oswin K., Traverse City, Mich.; Indiana Dental College, 1912; died August 15; age 75.

Hindley, Joseph N. D., Ferndale, Calif.; College of Physicians and Surgeons, San Francisco; died August 13; age 65.

Hopkins, David, Denver; University of Denver School of Dentistry, 1900; died August 14; age 91.

Hornung, Raymond A., Fremont, Mich.; University of Michigan School of Dentistry, 1902; died August 12; age 81.

Howard, Menifee R., Denver; University of Denver School of Dentistry, 1907; died August 27; age 75.

Hoyt, William H., Wellesley Hills, Mass.; University of Pennsylvania School of Dentistry, 1912; died September 13; age 70.

Hurt, John B., Lafayette, Colo.; Vanderbilt University School of Dentistry, 1918; died September 14; age 62.

Ingram, E. Clay, Port Clinton, Ohio; Western Reserve University School of Dentistry, 1937; died August 9; age 54.

Jansen, Jerome J., San Francisco; University of California College of Dentistry, 1917; died August 24; age 66.

Jarvis, William A., Livingston, Mont.; University of Iowa College of Dentistry, 1916; died August 4; age 66.

Jersin, George B., Baltimore; Northwestern University Dental School, 1915; died September 2; age 66.

Jones, Burnell P., Danville, Va.; Baltimore College of Dental Surgery, University of Maryland, 1916; died September 12; age 67.

Jones, Clifford I., Breton Woods, N. J.; Temple University School of Dentistry, 1925; died August 29; age 57.

Krantz, Martin M., New York; Howard University College of Dentistry, 1940; died August 18; age 62.

Lacy, William E., Berkeley, Calif.; Meharry Medical College School of Dentistry, 1904; died July 17; age 74.

Ledden, Daniel C., Butler, Pa.; University of Pittsburgh School of Dentistry, 1923; died May 12; age 59.

Lemley, Levi G., Grinnell, Iowa; Chicago College of Dental Surgery, 1901; died June 14; age 88.

Levin, Michael L., Joliet, Ill.; Chicago College of Dental Surgery, 1918; died September 20; age 67.

Lewis, Peter S., Philadelphia; Meharry Medical College School of Dentistry, 1923; died August 16; age 62.

Logan, Harry L., Pottsville, Pa.; University of Pennsylvania School of Dentistry, 1903; died August 23; age 77.

Mack, Cornelius H., Pass-a-Grille Beach, Fla.; Harvard Dental School, 1906; died August 22; age 72.

Mall, Alexander H., Chicago; Indiana Dental College, 1924; died August 17; age 56.

Maloney, James D., Hudson Falls, N. Y.; Pennsylvania College of Dental Surgery, 1904; died May 9; age 77.

Marcantoni, Charles L., New York; Georgetown University School of Dentistry, 1957; died June 15; age 28.

Markarian, Asadoor, Pasadena, Calif.; Tufts College Dental School, 1915; died August 22; age 71.

Marlow, Samuel A., Madison, Wis.; Northwestern University Dental School, 1899; died August 10; age 84.

Marquard, E. Alfred, St. Louis; Washington University School of Dentistry, St. Louis, 1920; died July 22; age 63.

Marr, Maurice A., Michigan City, Ind.; Indiana Dental College, 1914; died May 18; age 67.

Marshall, Ronald A., Madison, Ill.; St. Louis University School of Dentistry, 1914; died May 30; age 67.

Martin, William W., Columbia, Mo.; Kansas City Dental College, 1908; died June 16; age 74.

Mashburn, Fred R., Prichard, Ala.; University of Alabama School of Dentistry, 1954; died August 17; age 41.

Matthews, Arnett P., San Francisco; Western Dental College, 1911; died July 10; age 71.

Matthews, Maylon B., Hazlehurst, Ga.; Atlanta-Southern Dental College, 1926; died June 29; age 59.

McAdoo, Charles C., Harrah, Okla.; New York College of Dentistry, 1885; died April 12; age 91.

McBride, Allen C., Enosburg Falls, Vt.; Temple University School of Dentistry, 1915; died June 30; age 65.

McCall, Quannah S., Las Vegas, Nev.; Kansas City-Western Dental College, 1926; died September 12; age 56.

McCaul, Philip H., Boston; Tufts College Dental School, 1942; died July 2; age 40.

McCrary, Benjamin W., Hot Springs, Ark.; Vanderbilt University School of Dentistry, 1917; died July 27; age 64.

McDonald, John B., Utica, N. Y.; University of Buffalo School of Dentistry, 1919; died June 2; age 62.

McGruer, John J., Eau Claire, Wis.; Northwestern University Dental School, 1918; died June 14.

McKinnon, John W., York, Pa.; Baltimore College of Dental Surgery, University of Maryland, 1889; died August 14; age 90.

McKissick, James T., Jr., Odessa, Texas; University of Tennessee College of Dentistry, 1932; died June 16; age 53.

McNally, George E., Everett, Wash.; College of Physicians and Surgeons, San Francisco, 1951; died June 30; age 40.

Melendez, Gilberto, San Francisco; College of Physicians and Surgeons, San Francisco, 1921; died September 14; age 64.

Meyer, Harry C., Indianapolis; Indiana University School of Dentistry, 1930; died June 13; age 59.

Meyers, Irvin A., Wauwatosa, Wis.; Northwestern University Dental School, 1917; died May 19; age 64.

Michel, Pierre A., St. Louis; Baltimore College of Dental Surgery, University of Maryland, 1898; died July 30; age 80.

Miller, Grover C., Guttenberg, Iowa; University of Iowa College of Dentistry, 1908; died March 31; age 73.

Miller, Ralph C., Johnson City, Tenn.; Southern Dental College, 1916; died July 20; age 67.

Miller, Warren T., Fort Wayne, Ind.; Indiana University School of Dentistry, 1929; died April 26; age 53.

Mkitarian, Luther M., Camden, N. J.; Temple University School of Dentistry, 1924; died September 28; age 62.

Monks, John S., Martins Ferry, Ohio; Philadelphia Dental College, 1900; died May 19; age 83.

Morin, Hercule C., San Diego, Calif.; University of California College of Dentistry, 1923; died June 28; age 67.

Morris, Amiel, Robles del Rio, Calif.; University of California College of Dentistry, 1895; died May 29; age 86.

Morris, Frank, Keystone Heights, Fla.; New York College of Dentistry, 1891; died June 30; age 88.

Morris, Murray P., Flushing, N. Y.; Columbia University School of Dental and Oral Surgery, 1927; died August 13; age 55.

Morton, Frank E., Albuquerque, N. M.; Indiana Dental College, 1904; died June 30; age 75.

Mumaw, John J., West Hazleton, Pa.; Temple University School of Dentistry, 1929; died September 11; age 51.

Myers, George H., Detroit; Detroit College of Medicine, Department of Dental Surgery, 1903; died May 1; age 79.

Neff, Samuel, Philadelphia; Temple University School of Dentistry, 1925; died September 10; age 57.

Nelson, Frank W., Phoenix, Ariz.; University of Iowa College of Dentistry, 1919; died August 13; age 61.

Nelson, John C., Marfa, Texas; Baylor University College of Dentistry, 1927; died June 6; age 56.

Nelson, Oscar E., Centralia, Wash.; North Pacific College of Oregon School of Dentistry, 1909; died June 9; age 81.

Nettleton, Douglas C., Manton, Mich.; University of Michigan School of Dentistry, 1930; died July 13; age 63.

Nielsen, Cyrus M., Richmond, Calif.; College of Physicians and Surgeons, San Francisco, 1928; died August 7; age 54.

Nissle, Roland O., Ann Arbor, Mich.; University of Michigan School of Dentistry, 1929; died September 7; age 54.

Novak, Frank J., Stevensville, Md.; Baltimore College of Dental Surgery, University of Maryland, 1925; died August 3; age 60.

Nygard, George H., Portland, Ore.; North Pacific College of Oregon School of Dentistry, 1923; died May 22; age 63.

O'Brien, James, Scranton, Pa.; University of Pennsylvania School of Dentistry, 1918; died August 19; age 70.

O'Connor, John A., South Norwalk, Conn.; University of Pennsylvania School of Dentistry, 1913; died April 20; age 69.

Olson, Aaron M., Chicago; Northwestern University Dental School, 1903; died April 20; age 82.

O'Quinn, Seward, Gainesville, Fla.; Atlanta Dental College; died March 9; age 80.

O'Reilly, Patrick J., Detroit; Detroit College of Medicine, Department of Dental Surgery, 1905; died March 22; age 79.

Orr, Agustus A., Riviera Beach, Fla.; Atlanta-Southern Dental College, 1915; died April 11; age 69.

Orr, Dana Rowell, Wilton, Maine; Tufts College Dental School, 1940; died August 7; age 42.

Ousley, Edward W., St. James, Mo.; Washington University School of Dentistry, St. Louis, 1906; died July 4; age 75.

Owens, Noble E., Overland, Mo.; Washington University School of Dentistry, St. Louis, 1921; died May 5; age 65.

Pace, Gordon R., Beverly Hills, Calif.; University of Southern California School of Dentistry, 1931; died March 21; age 50.

Page, Charles L., Baltimore; Baltimore College of Dental Surgery, University of Maryland, died May 29; age 68.

Palmer, William P., Chicago; Howard University College of Dentistry, 1918; died May 18; age 66.

Pancoast, Albert B., Camden, N. J.; University of Pennsylvania School of Dentistry, 1916; died July 19; age 64.

Patterson, John F., St. Paul; died May 6; age 77.

Peters, George D., Portland, Ore.; North Pacific College of Oregon School of Dentistry, 1904; died August 1; age 75.

Pigott, James W., Tylertown, Miss.; Vanderbilt University School of Dentistry, 1907; died June 21; age 76.

Pool, Hardy F., Mason City, Iowa; Northwestern University Dental School, 1902; died May 28; age 77.

Porter, Fred C., Dalton, Ohio; Starling-Ohio Medical College Department of Dentistry, 1910; died July 7; age 69.

Post, Foster S., Witter Springs, Calif.; University of Buffalo School of Dentistry, 1905; died September 12; age 76.

Price, Walter W., Charleston, W. Va.; Ohio College of Dental Surgery, University of Cincinnati, 1913; died July 16; age 68.

Purdum, Ray B., Indianapolis; University of Pittsburgh School of Dentistry, 1933; died September 6; age 62.

Rankin, Elton L., Los Angeles; University of Southern California School of Dentistry, 1923; died August 2; age 59.

Rawlings, Clarence A., New Castle, Ind.; Louisville College of Dentistry, 1916; died April 8; age 68.

Rea, Julia Wood, Forest Hills, N. Y.; died July 21; age 85.

Reardon, Neil E., Hudson, N. Y.; University of Buffalo School of Dentistry, 1920; died August 30; age 58.

Reese, Nathan, Philadelphia; Temple University School of Dentistry, 1932; died August 28; age 51.

Reid, Enos C., Riverside, Calif.; University of Southern California School of Dentistry, 1912; died June 21; age 73.

Reid, James H., Cleveland; Western Reserve University School of Dentistry, 1912; died September 16; age 68.

Reid, James P., Providence, R. I.; Philadelphia Dental College, 1904; died June 18; age 85.

Reid, Leslie, Mapleton, Iowa; University of Iowa College of Dentistry, 1910; died June 9; age 71.

Renkenberger, Francis E., Youngstown, Ohio; University of Michigan School of Dentistry, 1899; died July 19; age 86.

Restivo, Roy A., Toledo, Ohio; University of Detroit School of Dentistry, 1935; died August 22; age 49.

Revell, J. Clifford, Los Angeles; University of Southern California School of Dentistry, 1930; died August 2; age 54.

Rheinfeld, Irving A., Bridgeport, Conn.; died April 19; age 69.

Rhodes, Raymond A., Lewistown, Pa.; University of Pittsburgh School of Dentistry, 1930; died September 8; age 50.

Richardson, Mark S., Columbia, Tenn.; Vanderbilt University School of Dentistry, 1919; died September 1; age 62.

Rode, Norman R., Pittsburgh; University of Pittsburgh School of Dentistry, 1925; died August 30; age 56.

Rogow, Morris J., New York; New York College of Dentistry, 1915; died July 5; age 66.

Rokeach, Louis, Brooklyn; College of Dental and Oral Surgery, New York, 1905; died September 16; age 81.

Ross, Donald H., Saratoga, Calif.; University of California College of Dentistry, 1903; died September 16; age 79.

Richmond, Harry L., Adams, N. Y.; University of Buffalo School of Dentistry, 1915; died June 25; age 68.

Robinson, John E., San Antonio, Texas; Northwestern University Dental School, 1932; died August 5; age 49.

Roe, Ida G., Burlington, Iowa; Keokuk Dental College, 1908; died April 7; age 84.

Roenker, Charles J., Columbus, Ohio; Ohio State University College of Dentistry, 1930; died June 9; age 56.

Rogers, Ert J., Indianapolis; Indiana Dental College, 1919; died July 21; age 73.

Rosen, Joseph P., Palm Springs, Calif.; University of Southern California School of Dentistry, 1941; died July 22; age 43.

Ryder, W. Vernon, Boston; Harvard Dental School, 1905; died July 29; age 76.

Sachs, Seymour W., Washington, D. C.; New York University College of Dentistry, 1950; died August 3; age 35.

Savage, Frank L., Livermore, Calif.; died January 11; age 86.

Savage, George P., Ardmore, Pa.; University of Pennsylvania School of Dentistry, 1925; died July 9; age 63.

Scheibe, Henry N., Minneapolis; University of Minnesota School of Dentistry, 1922; died July 4; age 63.

Schenck, Mead I. S., West Pittston, Pa.; Philadelphia Dental College, 1898; died July 31; age 84.

Schildwachter, Louis C., Glendale, Calif.; University of Southern California School of Dentistry, 1915; died July 26; age 71.

Schilling, Ira J., Pittsfield, Mass.; Harvard Dental School, 1912; died August 7; age 67.

Schlieder, Clarence A., Lowville, N. Y.; University of Buffalo School of Dentistry, 1918; died September 2; age 62.

Schow, James W., Ogden, Utah; Northwestern University Dental School, 1923; died September 3; age 66.

Scott, Thomas R., Youngstown, Ohio; Ohio State University College of Dentistry, 1928; died June 10; age 55.

Scull, Raymond T., Reading, Pa.; University of Pennsylvania School of Dentistry, 1919; died August; age 60.

Secor, Frank C., Omaha; Chicago College of Dental Surgery, 1914; died September 5; age 68.

Setzler, William F., Denver; University of Michigan School of Dentistry, 1903; died August 13; age 83.

Shaak, Walter D., Kearny, N. J.; Baltimore College of Dental Surgery, University of Maryland, 1923; died September 9; age 57.

Shanklin, James L., Kerrville, Texas; St. Louis Dental College, 1907; died July 7; age 72.

Sheffey, Irvine E., Jamaica, N. Y.; Washington University School of Dentistry, St. Louis, 1927; died July 8; age 58.

Shelburne, Kenneth L., Zionsville, Ind.; Indiana Dental College, 1925; died July 8; age 57.

Shepson, Bradford F., Corning, N. Y.; University of Buffalo School of Dentistry, 1916; died September 5; age 65.

Sherman, Claude R., San Francisco; College of Physicians and Surgeons, San Francisco, 1925; died August 8; age 55.

Sherrard, Ben H., Rock Island, Ill.; Chicago College of Dental Surgery, 1911; died September 2; age 68.

Short, William B., Crescent City, Fla.; New York University College of Dentistry, 1895; died September 3; age 86.

Shultz, Fred S., Mint Spring, Va.; Baltimore College of Dental Surgery, University of Maryland, 1918; died May 22; age 70.

Siebecker, W. David, Wausau, Wis.; Northwestern University Dental School, 1901; died August 20; age 83.

Simkins, George C., Greensboro, N. C.; Howard University College of Dentistry, 1918; died June 11; age 73.

Skinner, James H., Oneonta, N. Y.; died March 18; age 85.

Sloane, Howard A., Queens Village, L. I., N. Y.; New York University College of Dentistry; 1928; died May 2; age 52.

Smith, Arthur D., Newark, N. J.; Pennsylvania College of Dental Surgery, 1909; died August 8; age 76.

Smith, J. Milton, New York; Columbia University School of Dental and Oral Surgery, 1921; died May 26; age 57.

Smith, Samuel E., Minneapolis; University of Minnesota School of Dentistry, 1922; died May 3; age 66.

Smith, William A., Niagara Falls, N. Y.; University of Buffalo School of Dentistry, 1905; died September 11; age 74.

Smollar, Samuel, Cicero, Ill.; University of Illinois College of Dentistry, 1924; died August 17; age 57.

Spiceland, Jack N., Mayfield, Ky.; University of Tennessee College of Dentistry, 1955; died July 31; age 28.

Spivak, Leo, New York; New York University College of Dentistry, 1917; died June 14; age 63.

Stack, Joseph A., New York; Columbia University School of Dental and Oral Surgery, 1924; died July 2; age 58.

Steen, Estus E., Medon, Tenn.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1935; died July 9; age 58.

Stegall, Jo H., Lindale, Ga.; Atlanta-Southern Dental College, 1931; died July 18; age 52.

Steinhauer, Carl F., Wilkes-Barre, Pa.; University of Pennsylvania School of Dentistry, 1918; died July 20; age 61.

Stemper, Clemens A., Brookfield, Wis.; Marquette University Dental School, 1937; died July 1; age 44.

Stephenson, Thomas P., Columbia, Ky.; University of Louisville School of Dentistry, 1915; died June 22; age 69.

Sternberg, Irvin M., Fort Smith, Ark.; Washington University School of Dentistry, St. Louis, 1907; died August 8; age 75.

Stine, Floyd D., Dayton, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1916; died August 11; age 63.

Strain, Homer E., Bloomington, Ind.; Indiana Dental College, 1895; died July 15; age 91.

Straith, Claire L., Detroit; Chicago College of Dental Surgery, 1918; died July 13; age 67.

Strange, Clifford, Portland, Maine; Harvard Dental School, 1916; died May 9; age 66.

Strauss, George J., Bangor, Wis.; Illinois School of Dentistry, 1901; died April 5; age 78.

Sullivan, Joseph F., Cambridge, Mass.; Tufts College Dental School, 1913; died September 10; age 73.

Swaney, Louis M., Smithville, Mo.; Kansas City Dental School, 1905; died July 4; age 81.

Sweigart, George W., New Castle, Ind.; Central College of Dentistry, 1902; died July 22; age 84.

Swinehart, Earl W., Baltimore; Ohio College of Dental Surgery, University of Cincinnati, 1902; died July 20; age 82.

Swinney, Anna B., Milwaukee; Kansas City Dental College, 1896; died April 18; age 86.

Swisher, Max E., Denver; Kansas City-Western Dental College, 1925; died January; age 57.

Thompson, George S., Cleveland; Western Reserve University School of Dentistry, 1919; died July 6.

Todd, Estel L., Oak Park, Mich.; Detroit College of Medicine, Department of Dental Surgery, 1907; died July 2; age 74.

Tomlin, Noel J., Wills Point, Texas; State Dental College, Dallas, Texas, 1918; died June 7; age 68.

Topp, Charles, Clintonville, Wis.; Milwaukee Medical College Dental Department, 1897; died May 24; age 82.

Tornholm, Axel T., Rock Island, Ill.; Omaha Dental College, 1905; died May 28; age 77.

Toussaint, Albert R., Berlin, N. H.; Tufts College Dental School, 1940; died August 23; age 47.

Traini, Anthony F., Mahanoy City, Pa.; Temple University School of Dentistry, 1958; died August 3; age 32.

Triece, Paul F., Frankfort, Ind.; Indiana University School of Dentistry, 1926; died March 17; age 54.

Trusler, Frank S., Vernon, Texas; Indiana Dental College, 1913; died August 15; age 78.

Turner, John A., Washington, D. C.; Howard University College of Dentistry, 1926; died September 25; age 57.

Urban, John G., St. Louis; Washington University School of Dentistry, 1911; died May 27; age 71.

Van Dyke, Colin I., Wyalusing, Pa.; University of Pennsylvania School of Dentistry, 1903; died June 15; age 88.

Van Valzah, Caryl G., Medford, Ore.; North Pacific College of Oregon School of Dentistry, 1924; died July 27; age 58.

Vlasak, Reynold E., Prague, Neb.; University of Nebraska College of Dentistry, 1931; died April 23; age 56.

Vogel, Ronald T., Madison, Wis.; Chicago College of Dental Surgery, 1911; died July 25; age 73.

Wadleigh, Gerald E., Chicago; Northwestern University Dental School, 1918; died September 6; age 62.

Wallin, Milo C., Gaylord, Minn.; University of Minnesota School of Dentistry, 1933; died July 23; age 49.

Walters, Raymond J., Bellingham, Wash.; North Pacific College of Oregon School of Dentistry, 1929; died August 14; age 52.

Waples, E. Carl, Elmira, N. Y.; University of Buffalo School of Dentistry, 1901; died February 12; age 91.

Warrenfells, Shannon P., Jr., Chattanooga, Tenn.; Atlanta-Southern Dental College, 1937; died August 31; age 43.

Watson, Charles M., Big Spring, Texas; St. Louis University School of Dentistry, 1917; died May 5; age 77.

Watters, Hugh W., Bethany, Ill.; Northwestern University Dental School, 1918; died September 16; age 66.

Weaver, Frank B., Churubusco, Ind.; Northwestern University Dental School, 1900; died July 29; age 86.

Weene, Fredric I., Brighton, Mass.; Tufts College Dental School, 1914; died September 12; age 67.

Wehrheim, John L., Chicago; Northwestern University Dental School, 1907; died June 9; age 72.

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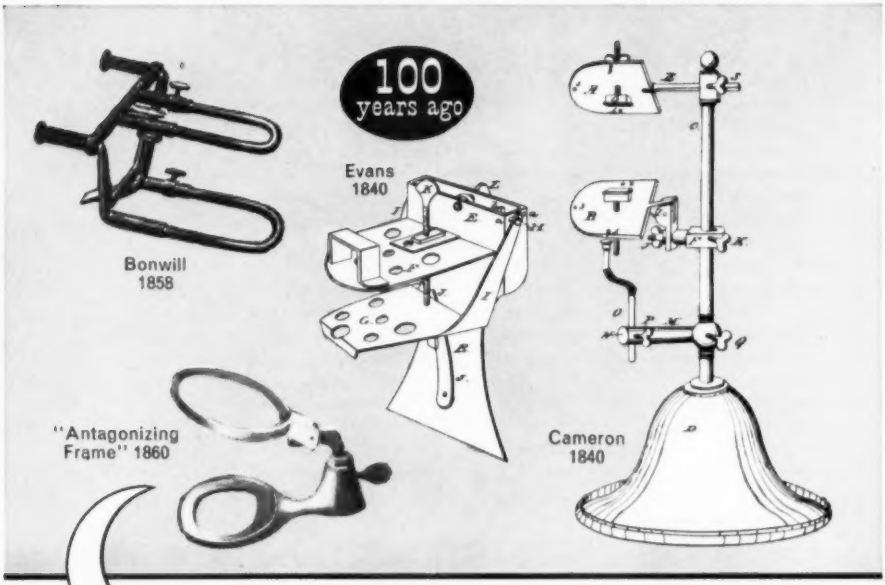
One-Hundredth Annual Session	September 14-18, 1959	New York
One-Hundred and First Annual Session	October 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N. J.

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 19-22	Birmingham	C. R. Crook, Professional Center, Montgomery
Alaska	July 13-15	Anchorage	R. D. Livie, 500 K St., Anchorage
Arizona	May 6-9	Scottsdale	W. G. Burke, 15 E. Monroe St., Phoenix
Arkansas	Apr. 12-15	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 20-22	San Francisco	W. J. Healy, 518 Sutter St., San Francisco 8
S. California	May 4-6	Los Angeles	S. M. Silverman, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 4-7	Colorado Springs	G. H. Siersma, 724 Republic Bldg., Denver 2
Connecticut	May 13, 14	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware	June 12, 13	Wilmington	E. J. Truono, 1401 Gilpin Ave., Wilmington 6
Dist. of Columbia	Mar. 15-18	Washington	J. F. Keaveny, 1835 Eye St., N.W., Washington 6
Florida	May 17-20	Hollywood	R. P. Groom, 3127 Atlantic Blvd., Jacksonville
Georgia	Oct. 25-28	Atlanta	F. M. Butler, Jr., Bankers Insurance Bldg., Macon
Hawaii	June 14-18	Honolulu	J. H. Dawe, 810 N. Vineyard St., Honolulu
Idaho	June 22-24	McCall	J. R. Olesberg, 214 Third St., Coeur d'Alene
Illinois	May 11-13	Peoria	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 18-20	Indianapolis	W. R. Shoemaker, Citizens Bank Bldg., Anderson
Iowa	May 3-6	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines
Kansas	Apr. 26-29	Topeka	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 5-8	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	Apr. 1-4	Shreveport	J. S. Bernhard, 2515 Line Ave., Shreveport
Maine	June 18-20	Rockland	S. M. Gower, Box 27, Skowhegan
Maryland	May 3-6	Baltimore	C. L. Inman, Jr., Medical Arts Bldg., Baltimore
Massachusetts	May 3-6	Boston	H. E. Tingley, 12 Bay State Rd., Boston 15
Michigan	Apr. 20-22	Grand Rapids	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 13-15	Minneapolis	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4
Mississippi	June 21-24	Biloxi	B. A. Cohen, Box 9981, Jackson 27



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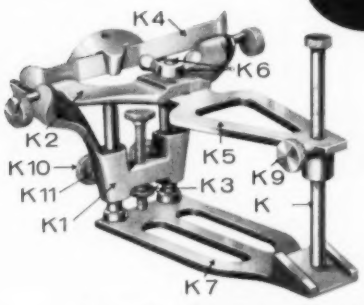

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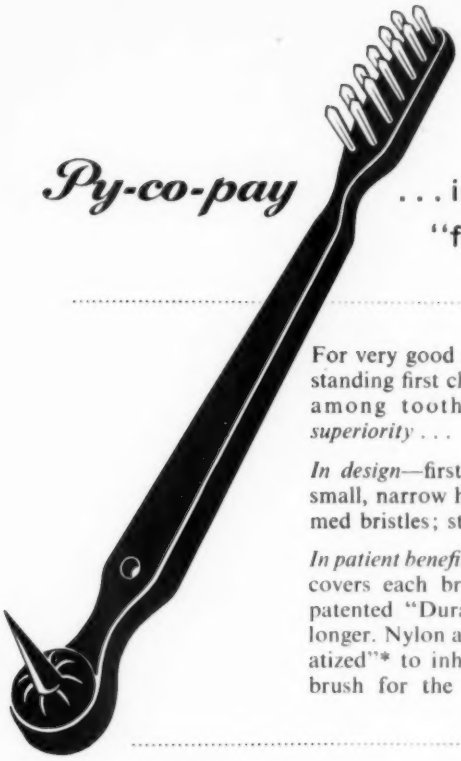
Montana	May 7-9	Kalispell	R. C. Ritter, 28 N. Black St., Bozeman
Nebraska	Apr. 26-29	Lincoln	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	May 10-12	Las Vegas	O. M. Seifert, 755 Ryland Ave., Reno
New Hampshire	June 21-24	Whitefield	F. E. Williams, 814 Elm St., Manchester
New Jersey	May 12-15	Atlantic City	J. G. Carr, 407 Cooper St., Camden
New Mexico	June 7-10	Santa Fe	W. A. Blueher, 24 Medical Arts Sq., N.E., Albuquerque
New York	May 10-13	Syracuse	C. A. Wilkie, 1 Hanson Pl., Brooklyn 17
North Carolina	May 3-6	Pinehurst	L. H. Butler, Jefferson Bldg., Greensboro
North Dakota	May 3-6	Grand Forks	J. H. Pfister, 419½ Dakota Ave., Wahpeton
Ohio	Oct. 25-28	Cleveland	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 26-29	Tulsa	L. D. Wright, Osler Bldg., Oklahoma City
Oregon	Mar. 2-4	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.			G. E. Lilly, Box 29, Ft. Clayton
Pennsylvania	May 13-16	Harrisburg	M. D. Zimmerman, 217 State St., Harrisburg
Puerto Rico	Jan.	San Juan	J. E. Munoz, Box 9023, Santurce
Rhode Island	Jan. 20, 21	Providence	H. A. McGuirl, Union Trust Bldg., Providence
South Carolina	May 24-26	Charleston	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 31-June 2	Rapid City	R. E. Decker, Box 308, Parker
Tennessee	May 11-14	Nashville	K. P. Ezell, 116 N. Academy, Murfreesboro
Texas	May 3-6	San Antonio	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah	May 21-23	Salt Lake City	R. C. Dalgleish, State Capitol Bldg., Salt Lake City
Vermont	June 26-28	Manchester	E. C. Woods, 36 Washington St., Rutland
Virginia	Apr. 8-11	Roanoke	W. T. McAfee, Colonial National Bank Bldg., Roanoke
Washington	Apr. 6-8	Seattle	G. D. Dore, Jr., 211 Medical Dental Bldg., Seattle 1
West Virginia	July 19-22	White Sulphur Springs	G. N. Casto, Jr., 710½ Lee St., Charleston
Wisconsin	Apr. 27-29	Milwaukee	C. J. Bautmann, Jr., 606 W. Wisconsin Ave., Milwaukee
Wyoming	June 18-20	Moran	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary and Address*
Alabama	June 21-27‡		W. L. Smith, 524 Chestnut St., Gadsden
Alaska	July 7-10*†	Anchorage	R. H. Williams, Box 2122, Juneau
Arizona	June 15‡		W. G. Biddulph, 1611 N. Second Ave., Glendale
Arkansas	June 15-19	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California	Feb. 2 June 22 July 27 August 31	Los Angeles Los Angeles San Francisco San Francisco	D. R. Grant, 507 Polk St., San Francisco
Colorado	June 21-27	Denver	R. F. Gilmore, Republic Bldg., Denver 2
Connecticut			A. P. Delfini, 265 Church St., New Haven
Delaware			J. F. Maguire, 1200 N. Van Buren St., Wilmington
Dist. of Columbia			W. T. Birthright, 1835 Eye St., N.W., Washington
Florida	July 5-16*‡ July 6, 7†‡		R. P. Taylor, Jr., P. O. Box 2913, Jacksonville 3
Georgia	June 8-10*†	Atlanta	W. G. Brown, Blackshear
Hawaii	Feb. 19-23	Honolulu	J. Y. Ing, James Campbell Bldg., Honolulu
Idaho			W. M. Smith, 305 Fort St., Boise
Illinois			W. A. McKee, Wood Bldg., Benton
Indiana			C. A. Frech, Gary National Bank Bldg., Gary
Iowa	June 1-5*†	Iowa City	P. A. Hahn, Farmers & Merchants Bank Bldg., Burlington
Kansas			G. L. Teall, Box 71, Hiawatha



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Maine			A. S. Appleby, Box 260, Skowhegan
Maryland	June 8-10	Baltimore	W. D. Burton, 829 Park Ave., Baltimore 1
Massachusetts			C. R. Williams, 70 Washington St., Salem
Michigan	Jan. 18-24*† June 7-13*†	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd., Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4 W
Mississippi	Jan. 5-7*†‡		A. H. Richter, Jr., Aven Bldg., Greenwood
Missouri			R. R. Rhoades, Central Trust Bldg., Jefferson City
Montana			R. O. Betzner, 303 Power Block, Helena
Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada			R. Whitehead, 40 W. First St., Reno
New Hampshire	June 18, 19* June 18†	Boston	S. G. Markos, 8 Renaud Ave., Dover
New Jersey			C. J. Schweikhardt, 150 E. State St., Trenton
New Mexico			G. D. Hastain, Box 1007, Clovis
New York	June 23-26* June 23, 24†	New York Albany Syracuse Buffalo Rochester	D. W. Beier, 23 S. Pearl St., Albany 7
North Carolina	June 22*†	Chapel Hill	J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota	July 13-17	Fargo	G. F. Wirtz, Clinic Bldg., Mandan
Ohio			D. E. Bowers, 322 E. State St., Columbus 15
Oklahoma			W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon			F. L. Utter, Pioneer Trust Bldg., Salem
Pennsylvania			P. Swanson, 8111 Jenkins Arcade, Pittsburgh
Puerto Rico			J. Mercado C., Comercio St. #452, San Juan
Rhode Island			F. M. Hackett, 267 Academy Ave., Providence
South Carolina			W. J. Brockington, 1508 Washington St., Columbia 1
South Dakota			H. T. Aker, Canton
Tennessee			C. R. Aita, Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber, Capital National Bank Bldg., Austin 16
Utah	June 22-27‡		R. W. Fishburn, 4 Professional Center, Brigham City
Vermont	June 22-24‡		P. M. Fitch, Newport
Virginia	June 8-13* June 10, 11†	Richmond	J. M. Hughes, Medical Arts Bldg., Richmond
Washington			F. S. Rotchford, 1108 S. Washington St., Olympia
West Virginia	June 22-24‡		C. C. Cottrill, Box 111, Glen Rogers
Wisconsin			S. F. Donovan, Tomah
Wyoming			E. E. Edwards, Bank of Commerce Bldg., Sheridan

**Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. Most states require applications to be in 30 days prior to examination date*

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secretary or Chairman and Address
Academy of Dentistry for the Handicapped	Feb. 8	Chicago	R. Kaplan, 3038 Federal St., Camden, N.J.
Academy of Denture Prosthetics	Apr. 12-17	Louisville, Ky.	W. L. Warburton, Medical Arts Bldg., Salt Lake City 11
Academy of General Dentistry	Feb. 8-11	Chicago	Albert L. Knab, 8500 S. Stony Island Ave., Chicago
All India Dental Conference (Twenty-fourth)	Feb. 19	Bangalore	R. S. Padmanabhan, 29 Vanivilas Road, Basavangudi, Bangalore 4, India

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
American Academy of Crown and Bridge Prosthodontics	Feb. 7, 8	Chicago	W. E. Corry, 2165 Adelbert Rd., Cleveland 6
American Academy of Dental Medicine	May 14-17	Atlantic City	W. I. Levine, 809 Cathedral St., Baltimore, Md.
American Academy of Dental Practice Administration	Feb. 5, 6	Chicago	R. H. Campbell, 18595 Grand River Ave., Detroit 23
American Academy of Maxillofacial Prosthetics	Feb. 4-6	Chicago	H. C. Sullivan, 1516 Wealthy St., S.E., Grand Rapids 6, Mich.
American Academy of Occlusodontia	Feb. 7	Chicago	S. S. Goldberg, 4753 N. Broadway, Chicago 40
American Academy of Oral Pathology	Apr. 17-19	Minneapolis	R. J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis 14
American Academy of Restorative Dentistry	Feb. 7, 8	Chicago	M. H. Mortonson, Jr., 735 N. Water St., Milwaukee 2
American Association for Cleft Palate Rehabilitation	Apr. 30-May 2	Philadelphia	D. C. Spriestersbach, Dept. of Otolaryngology, University Hospitals, Iowa City, Iowa
American Association of Endodontists	Feb. 6-8	Chicago	V. B. Milas, 2559 W. 63rd St., Chicago 29
American Association of Industrial Dentists	Apr. 27-29	Chicago	E. R. Aston, Pennsylvania Dept. of Health, P.O Box 90, Harrisburg, Pa.
American Association of Orthodontists	May 4-7	Detroit	E. E. Shepard, 8230 Forsyth Blvd., St. Louis
American Board of Oral Surgery	Apr. 2-6	Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 27-May 2	Detroit	W. L. Wylie, University of California, The Medical Center, San Francisco
American Board of Pedodontics	Dec. 14-17	Chicago	R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Dental Society of Europe	July 7-10	Stockholm Sweden	J. P. Molony, 110 Harley St., London W.1, England
American Denture Society	Feb. 6, 7	Chicago	V. L. Steffel, College of Dentistry, Ohio State University, Columbus, Ohio
American Equilibration Society	Feb. 5	Chicago	M. M. Devan, Spruce Medical Bldg., Philadelphia
Australian Dental Congress (Fifteenth)	Feb. 23-27	Adelaide, So. Australia	M. J. Barrett, 51 Grenfell St., Adelaide, So. Australia
Berkshire Conference (Tenth)	June 14-18	Lenox, Mass.	I. Glickman, Tufts University School of Dental Medicine, 136 Harrison Ave., Boston 11
British Dental Association	May 25-29	Torquay, England	Secretary, British Dental Association, 13 Hill St., Berkeley Square, London W. 1
Canadian Dental Association	June 21-24	Halifax	D. W. Gullett, 234 St. George St., Toronto 5, Canada
Central Dental Association	Jan. 18-21	Whitefish, Mont.	R. E. Baker, Lowry Bldg., St. Paul 2
Chicago Dental Society	Feb. 8-11	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
Congress of Dental Science	May 6-10	Knokke-sur-Mer, Belgium	A. G. Vermeersch, 8, Place Foch, Louvain, Belgium
Council on Dental Education, Dental Aptitude Tests	Jan. 9, 10 Apr. 17, 18		S. Peterson, 222 E. Superior St., Chicago 11
Cuban National Dental Congress (Fifth)	Mar. 29-31	Havana	C. Funcia C., No. 353, Vedado, Havana, Cuba
Dallas Mid-Winter Dental Clinic (Thirty-second)	Jan. 25-28	Dallas, Texas	M. Thornton, 2921 Fairmount, Dallas, Texas
Denver Dental Association	Jan. 11-14	Denver	W. D. McCarthy, Republic Bldg., Denver 2
Federation Dentaire Internationale, 47th Annual Meeting	Sept. 12-19	New York	G. H. Leatherman, 35 Devonshire Place, London W.1, England
Florida East Coast Dental Society	Jan. 9, 10	Miami, Fla.	A. Linsner, 2 S.E. 13th St., Miami 32, Fla.
German Dental Congress (Fourteenth)	May 27-31		F. H. Witt, Universitatstrasse 73, Koln-Lindenthal, Germany
Greater Philadelphia	Mar. 3-6	Philadelphia	M. Kohn, Sheraton Hotel, 17th St. and Pennsylvania Blvd., Philadelphia 3

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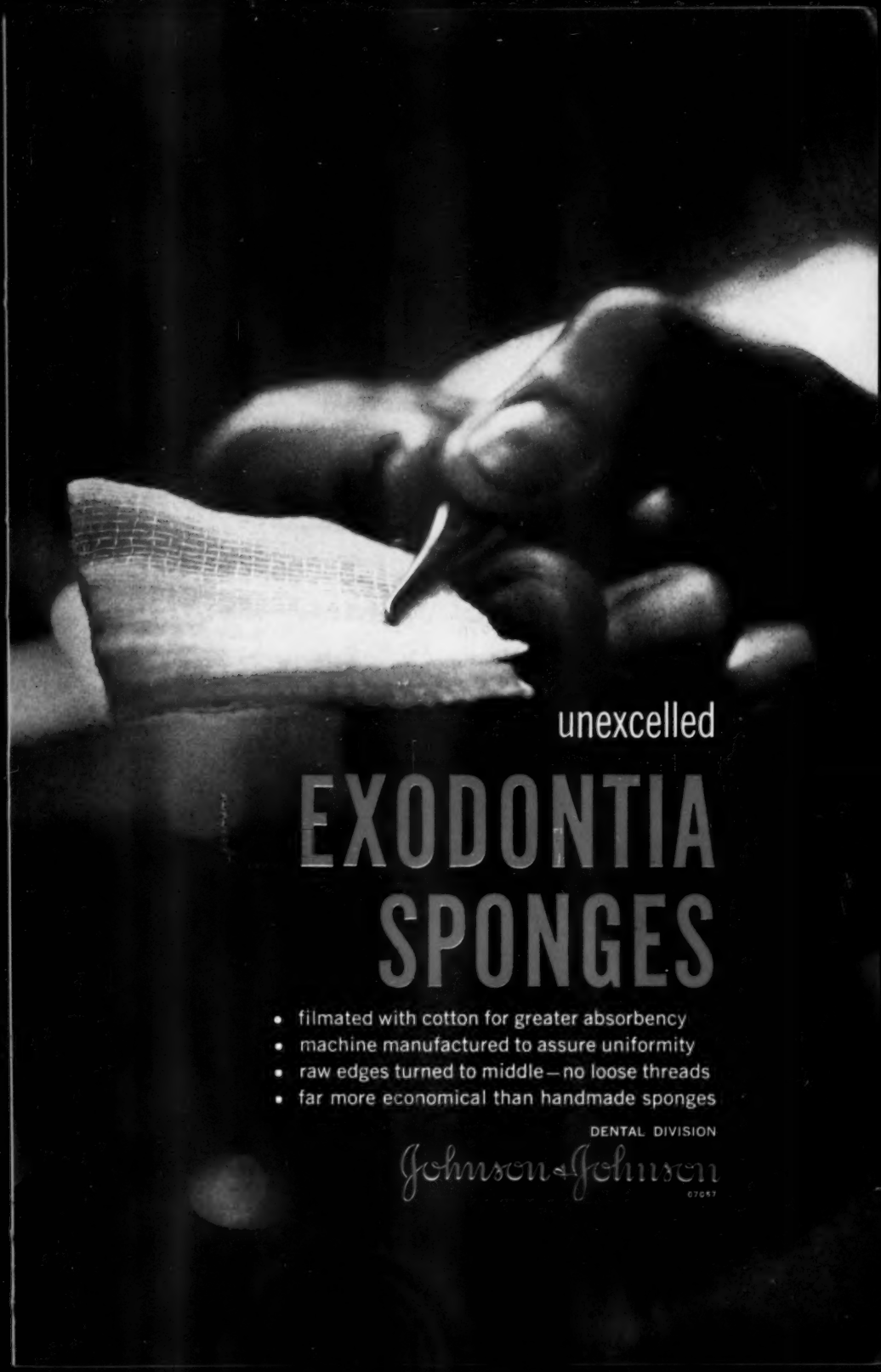
Name	*Date*	*Place*	*Secretary or Chairman and Address*
International Association for Dental Research	Mar. 19-22	San Francisco	D. Y. Burrill, Northwestern University, 311 E. Chicago Ave., Chicago 11
Japan Dental Association	Mar.	Tokyo, Japan	T. Kashima, 6-4 Kudan Chiyoda-ku, Tokyo
Midwest Society of Periodontology	Feb. 7, 8	Chicago	G. Roth, University of Kansas City, School of Dentistry, 1108 E. Tenth St., Kansas City 6, Mo.
Montana, Ninth District Dental Society	Jan. 15-17	Billings	C. H. Betzer, 1231 N. 29th St., Billings, Mont.
National Board of Dental Examiners	Apr. 2, 3 Nov. 30, Dec. 1		G. J. Casey, 222 E. Superior St., Chicago 11
Northwest Academy of Dental Medicine	May 24-28	Sun Valley, Idaho	G. Underwood, Selling Bldg., Portland 5, Ore.
Philippine Dental Association	May 13-17	Manila	D. G. Santos, P. O. Box 1142, Manila
Southeastern Academy of Prosthodontics	Mar. 13-15	Atlanta, Ga.	H. C. Parker, Liberty Life Building, Charlotte 2, N. C.
Southeastern Society of Oral Surgeons	May 7-9	Gatlinburg, Tenn.	P. B. Whittington, Jr., Medical Arts Bldg., Greensboro, N. C.
Southern Academy of Oral Surgery	Mar. 14, 15	Atlanta, Ga.	T. E. Braly, Volunteer Bldg., Chattanooga, Tenn.
Southern Academy of Periodontology	June 11-13	Gatlinburg, Tenn.	J. R. Owings, 7 Medical Ct., Greenville, S.C.
Thomas P. Hinman Dental Clinic	Mar. 15-18	Atlanta, Ga.	H. W. Wallace, 1193 The By Way, N.E., Atlanta, Ga.
U.S.C. Dental Study Group of Mexico, Twelfth Annual Seminar	May 17-21	Acapulco, Mex.	C. J. Cornish, Paseo de la Reforma 510-601, Mexico 6, D.F.
Western Society of Periodontology	Mar. 15-17	Las Vegas, Nev.	E. F. Johnson, 250 E. Seventh St., Upland, Calif.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The clasp and the survey line

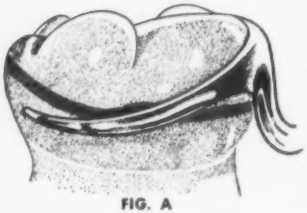

FIG. A

A clasp has three basic elements: a rigid section near the point of attachment to the denture for bracing; an occlusal rest for support; and the flexible retaining tips. For adequate bracing the rigid portion hugs the tooth and must be located above the survey line. Only the flexible tips are positioned in the undercut below the survey line (Fig. A).

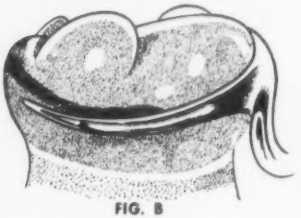

FIG. B

Placing any portion of the rigid section of the clasp below the survey line (Fig. B) results in a casting which will not seat unless the inside of the clasp is modified by grinding.

FIG. C

This alteration destroys the fit of the clasp (Fig. C) and the relieved section invites the retention of food debris between clasp and tooth. In addition, the bracing effect of a close fit is lost.

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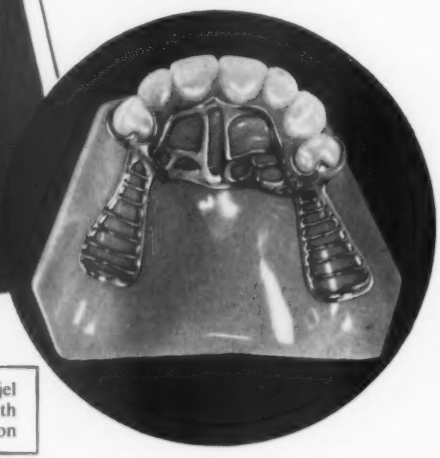

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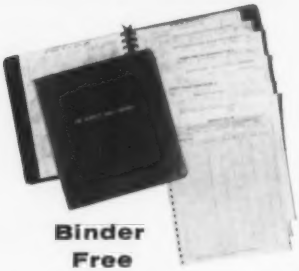

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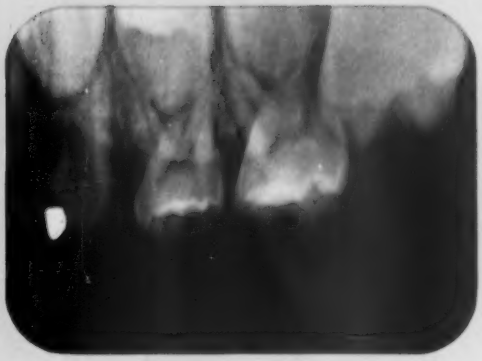
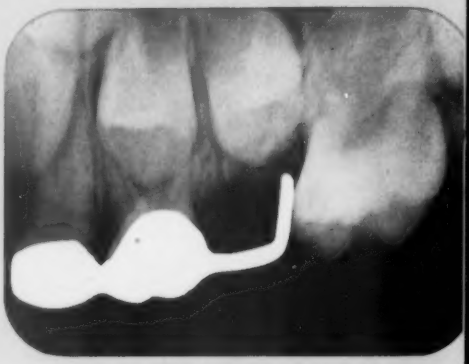


Atypical root resorption—upper right second primary molar. Ectopic eruption—upper right first permanent molar. *Age—seven years, eight months.*



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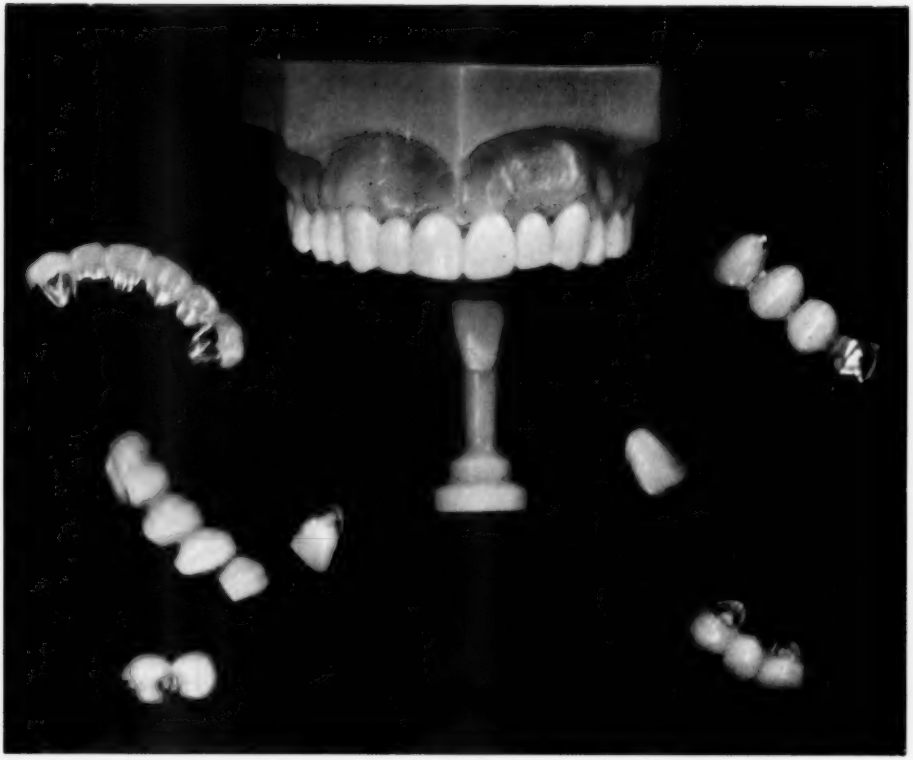

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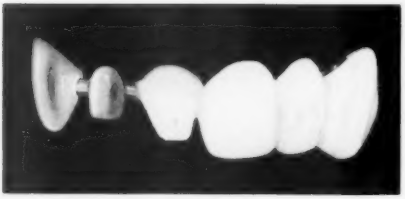

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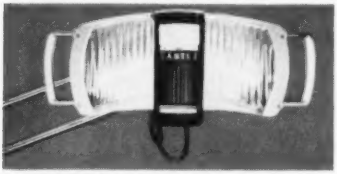

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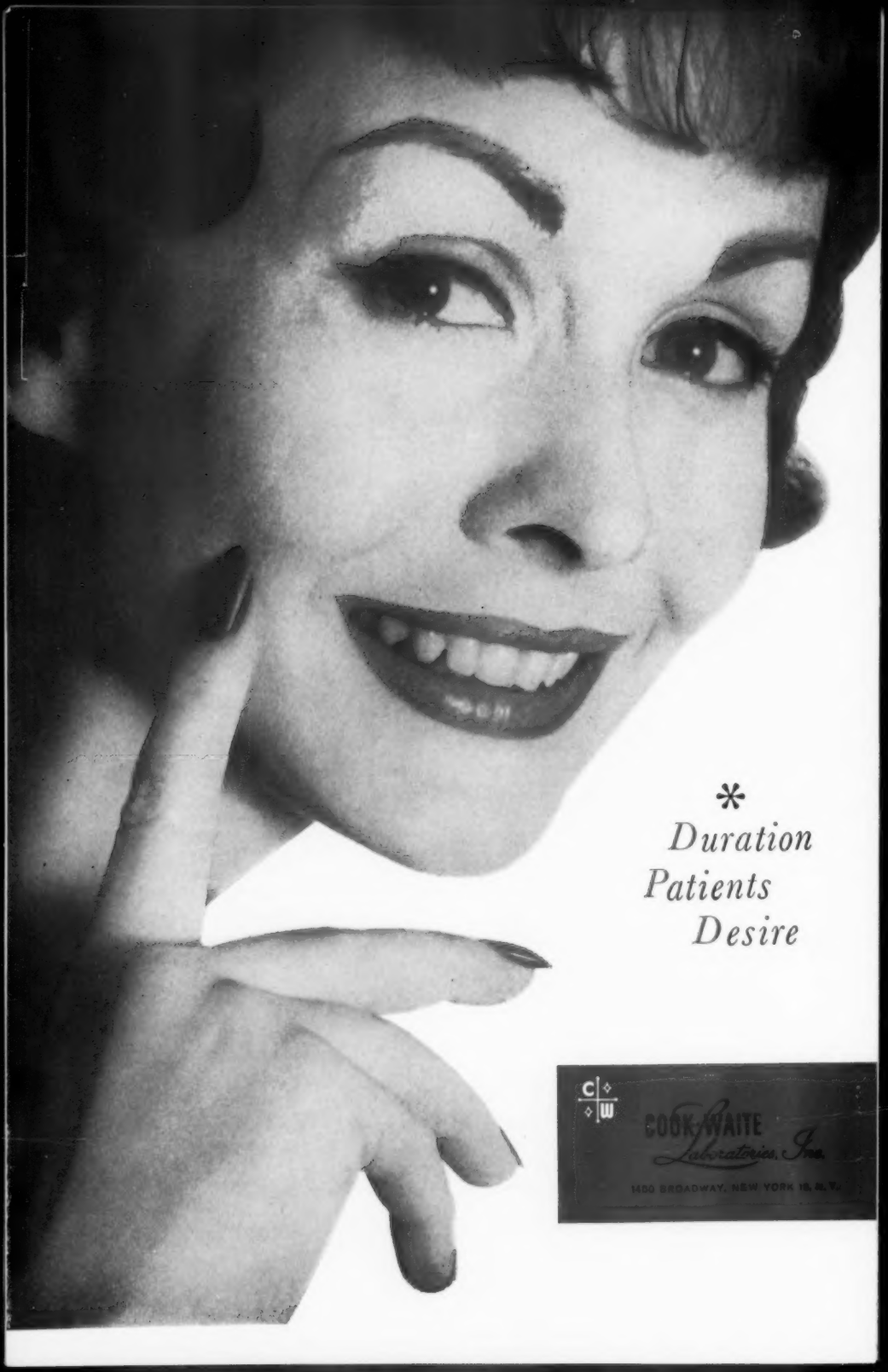
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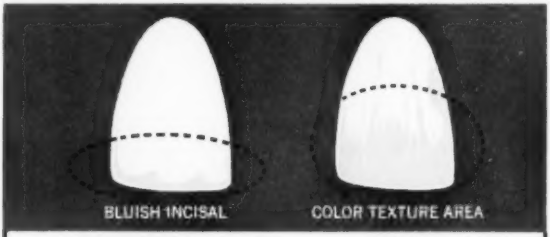

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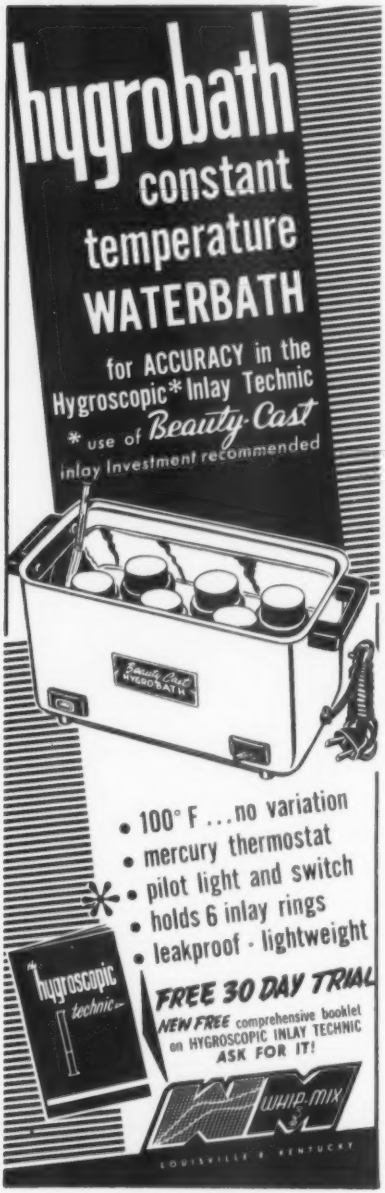

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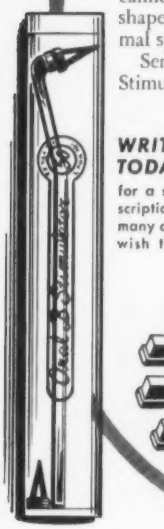

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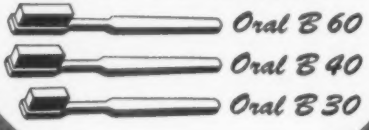

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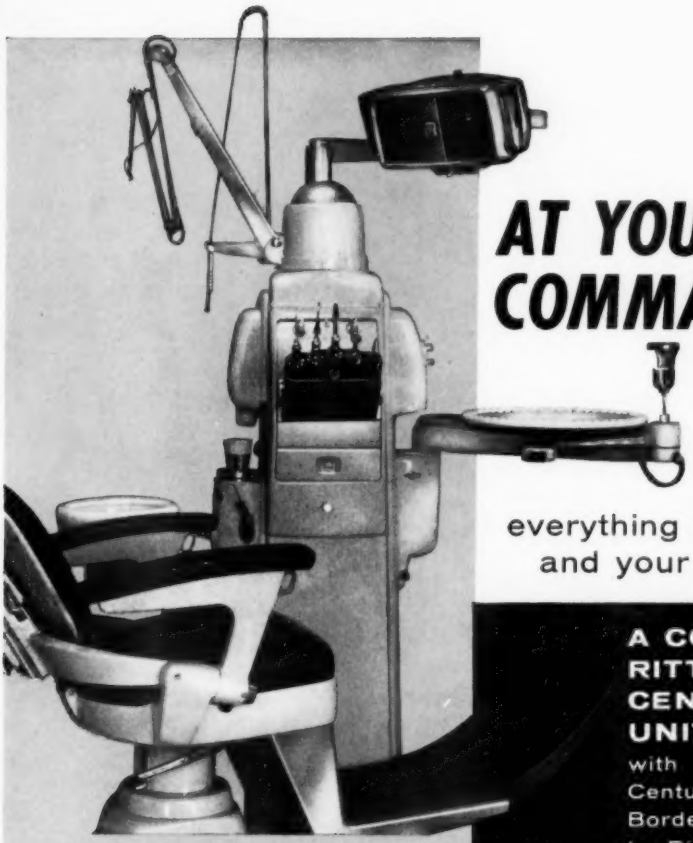

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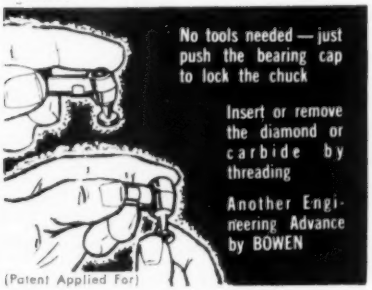
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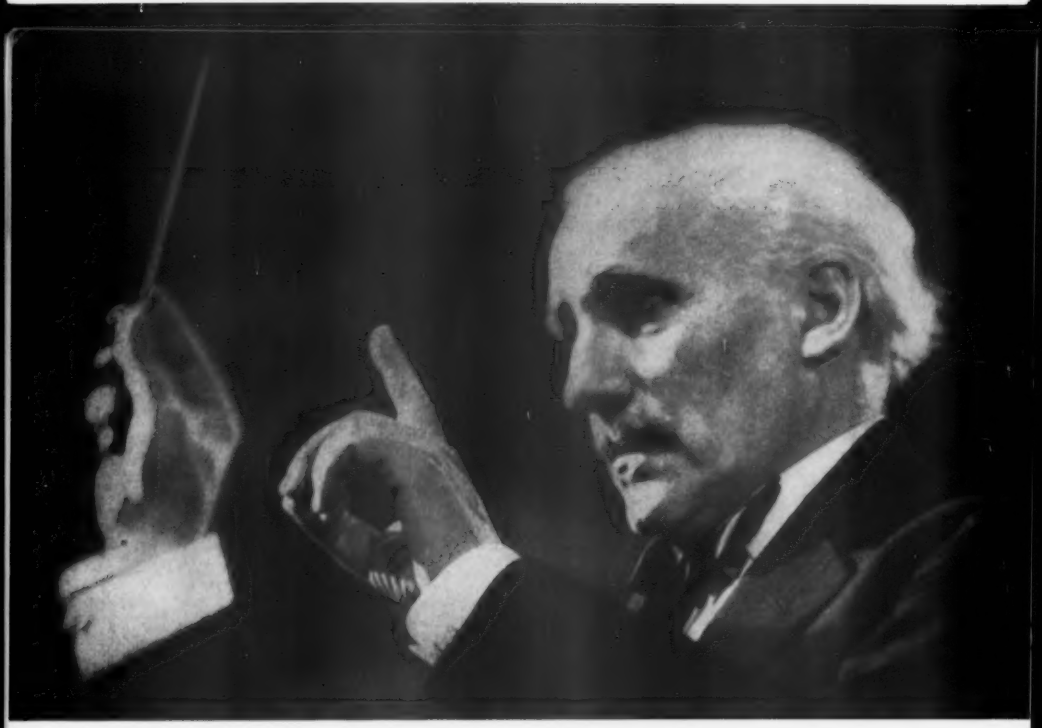

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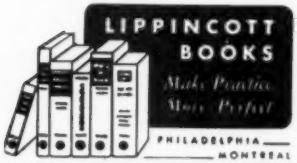

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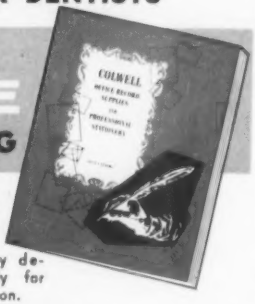

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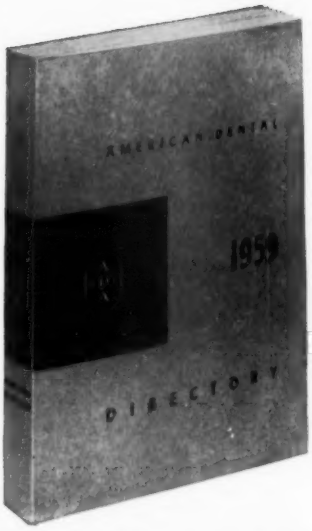

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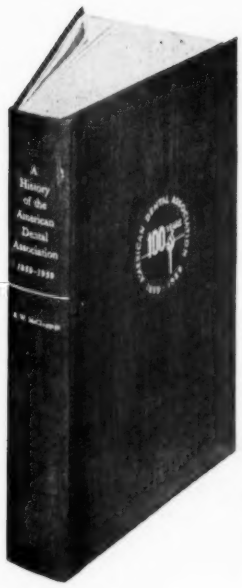

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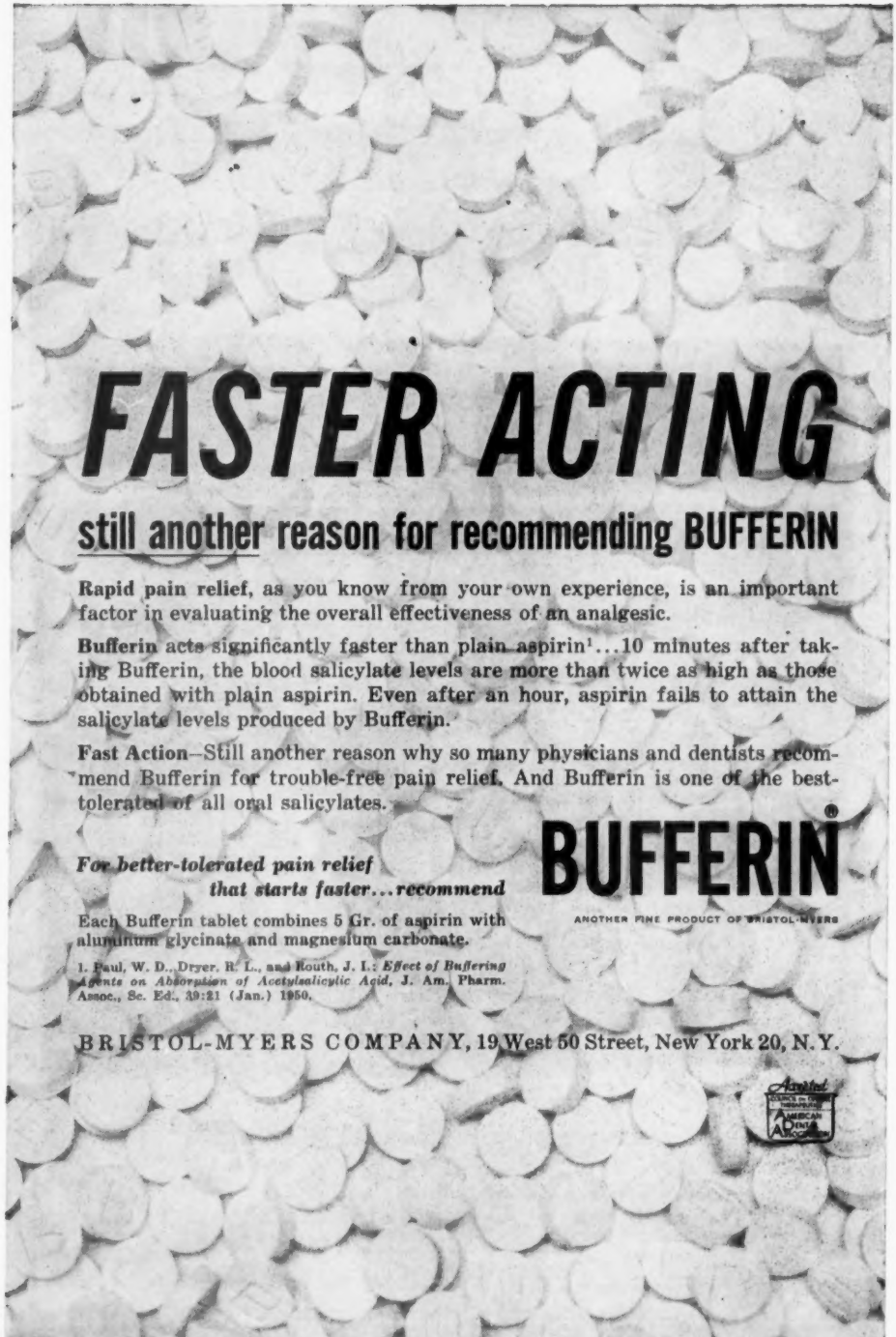
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